



Mulgrave School – East and West Additions
Development Permit 16-001

June 14, 2016

Westmount Consulting Ltd.
3210 Thompson Crescent
West Vancouver, B.C. V7E 3E5

June 14, 2016

District of West Vancouver
750-17th Street
West Vancouver, British Columbia
V7V 3T3

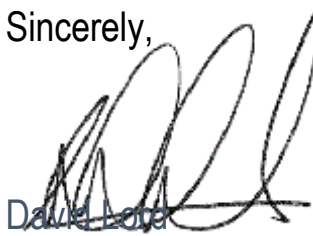
Attention: James Allan
Community Planner

Dear James:

Re: Mulgrave School – East and West Additions
Development Permit Application File No. 16-001

Further to our Development Permit Application dated January 21, 2016, our presentation to the Design Review Committee March 18, 2016 and our response to Design Review Committee comments dated May 16, 2016 and presentation June 2, 2016, we are pleased to enclose a consolidation of the foregoing submissions. We trust you will find this consolidation comprehensive and incorporates all of our responses to matters raised to date.

Sincerely,



David Lord
Project Manager

604-649-5019
david.lord@shaw.ca

Letter from Original DP Submission

MULGRAVE
SCHOOL

December 1, 2015

District of West Vancouver

750 – 17th Street
West Vancouver, British Columbia
V7V 3T3

Attention: Andrew Browne
Senior Community Planner

Dear Andrew:

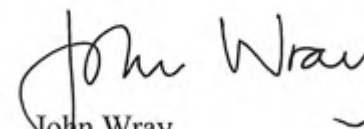
Re: Mulgrave School Phase 2 Additions
Development Permit Application

We are pleased to submit Mulgrave Independent School Society's Development Permit Application for its new Phase 2 East and West Additions. You will find the attachments very much in keeping with the plans that were reviewed with you in early September 2015 and suggestions you made.

With the successful completion of the new Senior School Addition (Phase 1), we are now anxious to proceed with this next phase in keeping with our Mulgrave School Campus Plan 2035. The proposed East and West Additions will ensure that Mulgrave School remains in the forefront of 21st Century Learning.

We again look forward to working with the District to see the successful completion of this exciting Phase 2 project.

Sincerely,



John Wray
Head of School

c.c. Harry Wierenga, Chair, Mulgrave Board of Directors
John Pao, Chair, Building and Grounds Committee
David Lord, Project Manager
Mark Koropecy, CEI Architecture



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1.0 Introduction



“Inspiring Excellence in Education and Life”

From its humble beginnings in 1993, Mulgrave School opened its West Vancouver Campus in 2001 followed by the addition of its Early Learning Centre in 2010. During 2011, Mulgrave School endeavored to anticipate its future facilities requirements through the development of its 2020 Vision Plan. In the process, it retained the services of CEI Architecture and Cornerstone Planning Group to assist in the development of a Long Term Facilities and Campus Plan Vision and as a result, created the Mulgrave School Campus Plan (2035) (attached on page 5). After the recent completion of its new Senior School Addition in 2015, Mulgrave School is now poised to move into its next phase of development to ensure that the School remains at the forefront of 21st Century Learning.

The Campus Plan identifies the facilities required to expand and enhance the School’s known program requirements and now the realized Senior School Addition will be followed by the West (Junior/Middle School) Addition and East (Athletics) Addition. It also includes other facilities that might be added in future years. The additional lands that Mulgrave has purchased immediately south of the school are also included in the Mulgrave Campus Plan.

Phase 1, the Senior School Addition, was completed in 2015 as the focus of the School’s initial expansion program. As part of the preparation of the 2035 Campus Plan, Davies Geotechnical Inc. prepared a Geotechnical Review and Slope Stability Review for the land located south and east of the existing school (refer to Appendix A).

Pedestrian traffic within the Campus is accommodated with sidewalks and walkways. A future circuit trail will also be constructed to encompass the site. Also, as part of the construction of the Junior/Middle School Addition, the access road to the north parking lot will be modified to include a marked pedestrian crossing to better accommodate the pedestrian trail connecting the Chippendale Road trail head with the residential development to be located immediately west of Mulgrave School. As no pedestrian traffic arrives, or is expected to arrive, on foot from Cypress Bowl Road, no offsite pedestrian improvements are contemplated.

Mulgrave School is now embarking on its second major Capital Campaign by engaging the support of the School’s Community. While Mulgrave School’s success in moving forward with these expansion plans will be dependent on its fundraising success within the School Community, it is not dependent on increasing the school population. In fact, Mulgrave School has committed “not to significantly increase the school population after building these new facilities, that each division of the school will continue to have a base in an area of the school and that the campus will retain its small community and family feel.” A minor increase in the ELC student population is projected (see page 10) to open opportunities for advancing children directly into the Mulgrave Junior School.

Mulgrave School has also committed to sustainable development practices and embracing the community at large through the sharing of its specialized facilities. In 2001 it entered into a Community Use Agreement with the District of West Vancouver and continues to work with the District to meet new and mutually beneficial objectives. Mulgrave School has identified a number of Sustainable Initiatives (see page 6) that it will endeavor to include during further design development of this project. They include initiatives to enhance the sustainable performance of the project, with a focus on reducing energy demands.

2.0 Information Requirements

Design Rationale



General Overview

The 2020 Vision Plan establishes an overall program of academic spaces that enhance the school's learning environment and dovetails with the physical layout of the existing facilities.

The addition of new space to the school results in the need to reconfigure a portion of the existing programmed spaces. A few of the classrooms have been re-assigned to group Junior and Middle School students within zones of the school that then tie into adjacent proposed facilities. The existing Early Learning Centre adjacent to the new turf field will be used as field house changing rooms on the lower floor and a Teachers' Professional Development Centre on the upper floor.

The table on page 10 summarizes the Mulgrave Student Body population. Apart from a minor increase to the enrolment of children in the Early Learning Centre, the school is maintaining the student population as it currently stands at a three classroom per academic year model.

The Phase 2 Development Permit Application concentrates on two areas of the site. An addition to the west end of the existing original "red brick school house" will house the new Early Learning Centre, expanded Art and Design Technology Studios, as well as a consolidated pod of Junior School learning spaces.

A proposed Athletics addition is to be located east of the existing Performing Arts "drum", which is the curved exterior wall adjacent to the new Cafeteria. The new stand-alone structure is intended to replace the existing Lower Gym and will house an expanded competition Gymnasium, Dance and Fitness Studios along with support spaces such as Departmental Offices, Change Rooms and Storage Rooms.

The East Addition will be linked to the existing school to provide internal connections at the Upper Main Level and Level 2. The Upper Main Level connection will be achieved by modifying the arrangement of Music Practice Rooms within the Music Department to provide circulation space. The Level 2 connection will be provided through the southeast exit doors of the existing Main Gym.

West Addition

The proposed three storey addition totals approximately 2,500 square metres. The Early Learning Centre (ELC) is located at the Lower Main Floor Level and is accessed through the west entrance of the recently constructed Senior School. The connection will be provided through the north wall of the locker alcove and through the foundation wall, which was designed to allow for this tie-in.

The heart of the four classroom ELC is the Multi-Purpose Room. This space is oval in plan to create a warm, rich environment for the children outside of their classrooms. The ELC population will have two classrooms of 16 three-year-old children each, and two classrooms of 24 four-year-old children each, for a total enrolment of 80 children. 388 sq m of devoted interior space for the children will exceed the Health Authority's mandate of 3.7 metres squared per child by over 90 sq m.

The outdoor area for the children has been carefully considered. The design by PMG Landscape Architects, with direct input from educators and staff, creates a stimulating outdoor environment replete with varying levels of activity and play. Following the Health Authority's guidelines, the space has been divided in two, allowing two user groups to be outside concurrently. The separating fence was designed to be as unobtrusive as possible, allowing visual access to both sides. Approximately 35% of the space has been given specific programming while 65% remains unprogrammed. A curving tricycle path connects both spaces while individual circuits are possible on each side independently. The curvilinear forms and natural play elements of logs, boulders, sand and water give reference to the ELC's location amidst the spectacular natural landscape of the North shore mountains. Opportunities for outdoor learning have been provided in semicircular seating areas on both sides. The exterior play and learning space meets the requirement for seven square metres per child and includes the provision for a possible future covered area for additional sun protected and all-season use.

Linkage between the proposed addition and the west end of the existing school, as well as access to all levels of each, is provided through a new atrium that contains an exit/connector stair and elevator. In the new West Addition, at the next level above the ELC located on the Upper Main Level of the School, are the Art and Design Tech Studios. These studios have direct access to the exterior along the west wall and direct access onto the existing multi-programmed green roof located to the south over the new Senior School.

Level 2 of the West Addition houses five Middle School classrooms, two small study rooms and a learning commons. This level has direct access to grade at the north where an existing children's play structure will be relocated. Above this level is the roof for the West Addition. It is designed as an outdoor learning and play environment for the Junior School and has a covered area of over 380 sq m. This rooftop amenity has a direct, level connection to the top floor of the existing school where Kindergarten through Grade 3 classrooms will be located.

The Level 3 rooftop amenity space has been designed to have approximately 20% programmed space, leaving the remaining 80% unprogrammed and available for free play. Mirroring the curving lines of the school and the organic forms of the ELC below, the ground plane of the Level 3 rooftop amenity has curving lines forming a circuitous path which separates the space into active and passive 'pods'. A cord climbing structure and vertical maze elements incorporate the overhanging roof's columns into their design, efficiently and creatively integrating the play environment with the architecture of the school.

Outdoor learning opportunities have been incorporated formally in the amphitheatre with views to the south and west and informally in the semicircular boulders located beneath the cover of the overhanging roof. Soft landscape elements have been included in raised planters providing green anchors of native and drought tolerant shrubs at the two ends of the sweeping curved roof edge.

The existing main buildings on the site provide the parameters for setting the massing for the West Addition. The massing along the southwest face of the West Addition is a smooth progression of the curve, which is scribed in the school campus by the Senior School Addition. The north elevation of the West Addition is set parallel to the original school.

The south and west elevations of the West Addition are a combination of an aluminum framed curtain wall system set within an insulated wall assembly. This wall assembly is finished at the exterior with red brick, matching the brick material used in the main body of the existing school building. Along the south and west walls, the brick will match the profile of the curved walls below, as shown on the floor plan. The north wall of the West Addition will also be finished in this red brick. The large punched windows along this elevation continue the rhythm of the window openings along the north elevation of the existing school.

To the north of the West Addition, it is intended to relocate the existing children's play structure currently located at the west end of the school. Because of the site grading and programmed use of roof space, each level on the West Addition has access to exterior learning and play space.

East Addition

The new physical education wing will replace the existing lower gym in order to provide enhanced programmed space. With direct access from the Upper Main Floor level and exterior access to and from the main sports field, the location of the new facility will serve as the core of the school's athletics curriculum.

For the most part, this new addition is considered as a stand-alone structure. The physical connection is limited to a two-storey vestibule, which also provides exits at both floor levels. This vestibule has been designed to provide a visual connection between the north and south sides of the East Addition. On the north side, grade is one level above the finished grade to the south and ties into the existing walkway located along the northeast corner of the existing school.

The main massing of the East Addition comprises two parts. As the principal athletic facility, the double gym has a clear height at centre court of 8.6 m and is constructed of steel framing and steel roof structure. The support facilities for the Competition Gym include the main entrance, Change Rooms, Offices, and Team Rooms located at Level 1 of the two-storey portion of the new addition. At Level 2, the Fitness Studio, Dance Studio and Viewer Lounge all overlook the Gym below. The Fitness Studio will also have a panoramic view to the south, capturing the vista from downtown Vancouver to UBC.

The south elevation of the two-storey portion of the East Addition matches the treatment of the new Cafeteria's south elevation. These two elevations flank the east and west sides of the main performing arts block of the existing school. The East Addition bookends the exterior space south of the curved elevation of the performing arts block and creates a courtyard terrace that overlooks the sports field to the south. The courtyard has direct access to the new seating bleachers that have been installed on the north side of the sports field.

The main massing of the double gym is clad with insulated metal panels. The design of the south elevation has been articulated to tie into the two-storey portion of the addition through the orientation of the metal panel cladding. The main colour of the cladding is to match the buff sand colour of the Senior School and proposed new West Addition to form a cohesive group of additions to the original red brick schoolhouse.



Consistency with Official Community Plan Policies

Our design team has carefully reviewed the relevant municipal documents to ensure that the new East and West additions to Mulgrave School not only recognizes but reinforces the community building principles stated for future development in the neighborhood and region.

Fundamental Community Building Principles

- Creating a strong community
- Establishing a sensitivity and connection to the natural environment and mountain qualities
- Encouraging a diverse community
- Focusing on environmental and economic sustainability

The sense of place that is stated as a priority for any future development will be influenced by the Mulgrave School Site, which will integrate not only these governing design principles, but the infrastructure and amenities which will serve and connect the larger North Shore community.

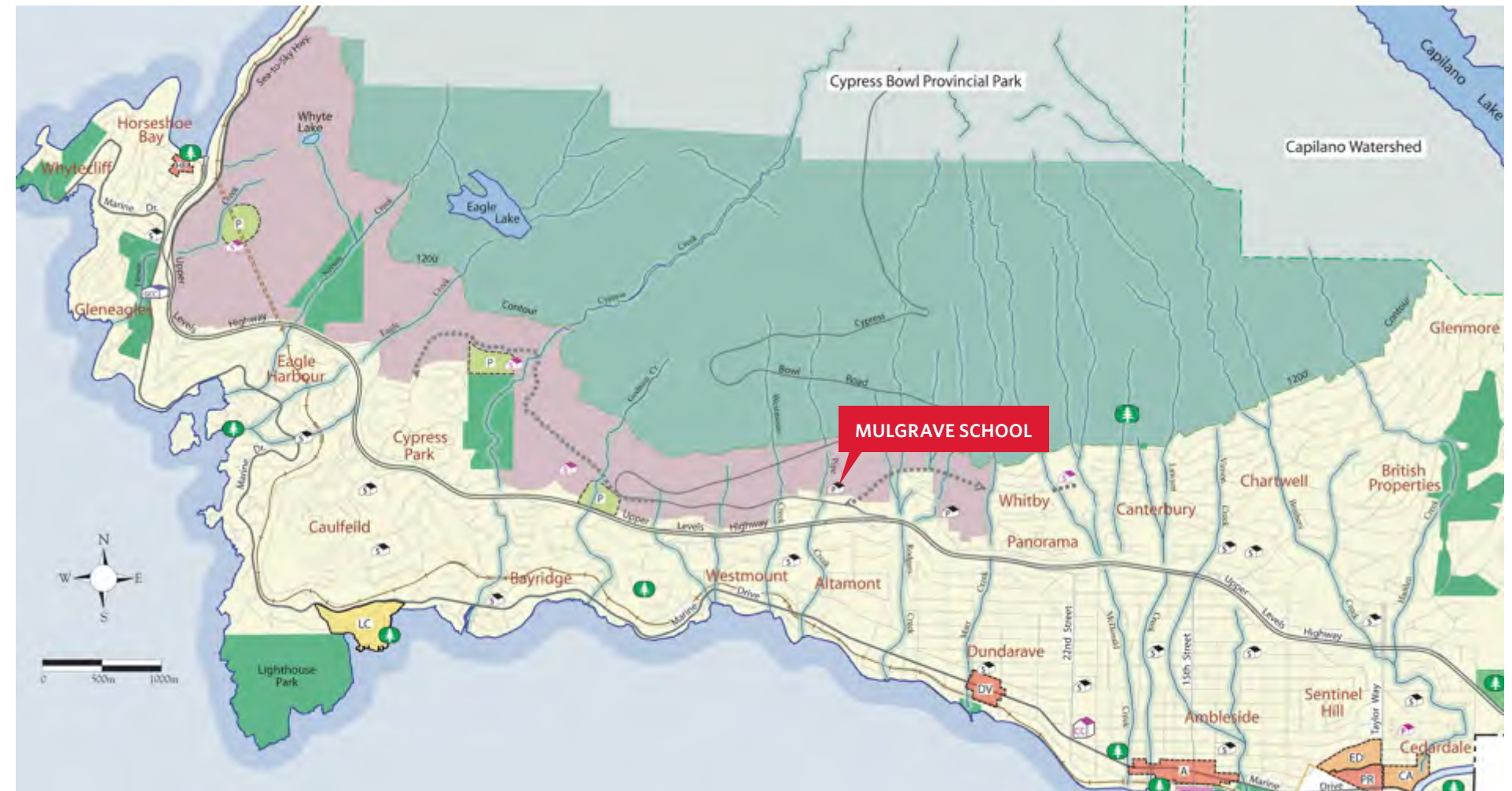
The existing school site is located in the Rodgers Creek Area Development Plan (March 7, 2008) and within the larger Upper Lands area described in Policy Section 7 of the Official Community Plan. There are several objectives outlined within this policy that the project is particular sympathetic towards including;

- Design of a built environment that takes into account environmental considerations and complements natural characteristics of the landscape, including building layouts, building types, roads and play areas.
- Provision of a diversity of home, lifestyle and recreation choices
- Creation of future neighborhoods that offer a range of amenities and services, including major parks, schools, trail systems and some commercial lands for locally convenient commercial services that have a sense of identity and that provide varied housing to meet resident needs.

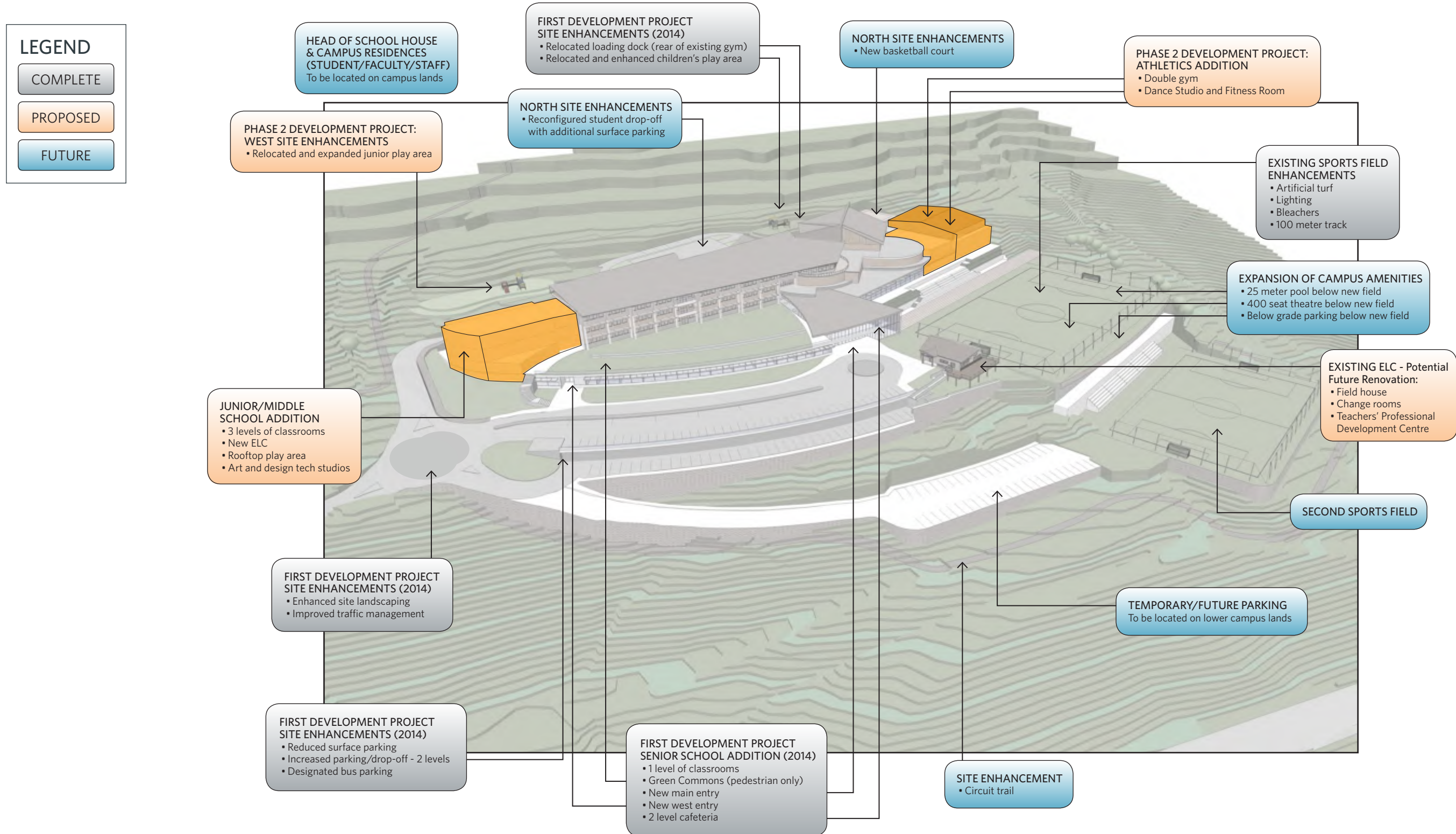
As stated elsewhere in our design rationale and sustainability summary, the design solution strives to improve upon the existing community amenity by minimizing its environmental impact while maximizing its sustainability potential. The site planning and building configuration recognize the topographic constraints and environmental sensitivities of the site while celebrating the natural heritage of the region and how it relates to the District of West Vancouver and to Greater Vancouver as a whole.

Policy Highlights

<ul style="list-style-type: none"> Existing Neighbourhoods - preserve and enhance character Future Neighbourhoods - base development on environmental considerations; use creeks to form open space framework, encourage a variety of housing Limited Use and Recreation Area - protect the natural environment; separate study for privately owned lands Clyde Avenue Area - allow mix of commercial and residential use Horseshoe Bay - promote seaside village character Evelyn Drive Area - study area for possible multi-family housing LC Lower Caulfield Heritage Conservation Area - protect heritage character 1200' - 1200' Elevation - upper limit of development; plan provides for community discussion of possible benefits of development above 1200' in exchange for public acquisition of lands with outstanding community benefit or environmental assets A Ambleside - enhance as Town Centre DV Dundarave Village - build upon local village character 	<ul style="list-style-type: none"> BC Rail - work to achieve pedestrian and cycling connections Park Royal - enhance role as gateway to West Vancouver Public School - maximize community use Private School - recognize role in the community Potential Future School Site - provide for school site acquisition in the Upper Lands at no public cost Civic Centre - integrate recreation and community services Argyle Avenue - Create plan and review waterfront acquisition policy Gleneagles Community Centre - neighbourhood focused recreation Future Road - 1000' Connector provides east/west route in Upper Lands Community Parks - provide parks and open spaces that meet a range of community needs Future Parks - acquire sites for three major community parks Foreshore - protect the shoreline; provide for public access
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Mulgrave School Campus Plan (2035)



Sustainability Initiatives



Our approach strives to reduce environmental site impacts by maximizing water efficiency, optimizing energy performance, and enhancing indoor air quality while integrating several other innovative sustainable design strategies. These efforts are all aligned with Mulgrave School's mission statement that states a belief that a global perspective and environmental and social responsibility are central to become true world citizens.

The design solution will integrate innovative practices, materials and techniques to ensure that building systems, technologies, components and finishes all optimize the sustainability and overall quality of the two new additions to Mulgrave School. These include;

Sustainable Site Initiatives

- Passive design features include aligning the addition along a predominantly east-west axis to help mitigate solar gain while maximizing daylighting and views.
- Leveraging the building as a thermal mass to equalize the heating and cooling cycles throughout the course of a day.
- Accessing the temperate regional environment by naturally ventilating with unconditioned outdoor air for free cooling.
- For stormwater management, the intent is to use the existing retention system in order to maintain the current level of net zero contribution to the municipal storm system.
- Mitigating the heat island effect of roof elements through the use of appropriately specific roof membranes and accessible roof areas.
- Encouraging carpooling and bicycle riding through a sustainable transportation program.

Energy Initiatives

- Employ a high performance envelope that judiciously employs glazing limited to 40% of the exterior walls.
- Placement of exterior and interior glazing to maximize the use of natural daylighting.
- Alongside this high performance envelope, the mechanical and electrical systems will be designed to improve the overall energy performance of the building by reducing energy consumption and associated costs while providing long term operational efficiencies, reduced maintenance and retrofitting costs and overall improved user comfort.
- Highly efficient air source heat pump distribution system which will provide maximum zoned control and efficiency. Heat recovery will then be achieved by equipping exhausts with energy recovery coils.
- Lighting design will focus on efficiency and automation to promote conservation throughout the life cycle of the facilities. By incorporating lower lighting densities and utilizing occupancy and daylight sensors, the energy consumption will be reduced.

Water Initiatives

- Respect the surrounding terrain and manage the significant stormwater runoff from both within and around the site.
- Stormwater management strategy will mitigate runoff volume and improve water quality.
- This irrigation strategy will be supported by the selection of regionally appropriate, drought resistant plant species.
- Highly efficient plumbing fixtures will also be specified throughout the new additions to significantly reduce potable water usage.

Material Initiatives

- The project will make use of materials selected for durability, functionality, aesthetics and their contribution to a smaller environmental footprint.
- Regional materials, with high recycled content, will be selected wherever possible.
- The use of wood will be emphasized in interior finishes to contribute to a warmer, more productive learning environment.
- Expand the Reduce/Recycle/Reuse program currently implemented throughout the school.

Indoor Environmental Quality

- Passive ventilation strategy utilizes the natural flow of air and stack effect to minimize the impact of the mechanical system.
- Specify only base building and interior finishes that conform to low VOC limits to ensure quality indoor air.
- Control sources of indoor chemical pollution, both from within the building as sources of maintenance and cleaning requirements, but also ingress from outdoor sources.
- Maximize daylighting throughout the floor plate while complying with thermal comfort standards to provide as optimal an academic environment as possible.

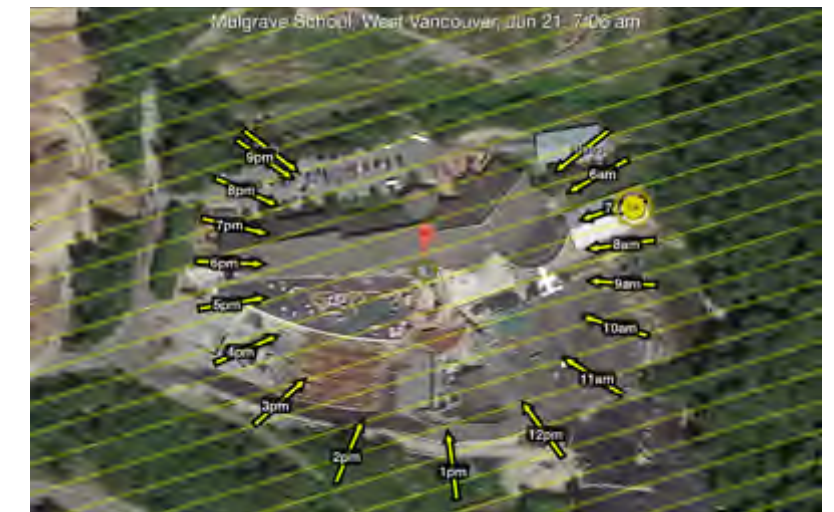
Integrated Design Opportunities		Description
ID.1	Passive design to improve building performance	Using design decisions that affect form and function to help thermal performance, weather protection, indoor air quality, and utility use. <ul style="list-style-type: none"> Limit glazing to 40% of exterior area. Utilize sun shading or high performance glazing for south facing windows. Use the structure as a thermal mass.
ID.2	Passive ventilation	Using the natural flow of air to create cycle in fresh air without the use of mechanical equipment. <ul style="list-style-type: none"> External shading and large operable windows will be reviewed.
ID.3	Materials selection	When choosing the materials, consideration will be given to: <ul style="list-style-type: none"> local sources. recycled and renewable content. life cycle performance and ability to recycle. durability. low VOC emissions.
ID.4	Native vegetation	The use of hardy local plants that don't require phosphorous. Also a teaching opportunity: natural habitats vs. invasive species, bioregions, microclimates.
ID.5	Manual and automatically operable windows	Provide classrooms with manually operable windows.
ID.6	High efficiency boiler	The cost of high efficiency gas fired boilers has been dropping, making this option affordable and sensible.
ID.7	Light dimming and switching	Intensity of lighting controlled with consideration on the amount of natural light in the space. Occupancy sensors used for turning lights on and off.
ID.8	Free cooling from HVAC economizers	Integrating the Heating and Ventilating system so it can pump 100% unconditioned outdoor air into the interior space when outdoor temperature is less than the indoor temperature.
ID.9	Stormwater retention and reuse for irrigation	Utilize the existing retention system in order to maintain the current level of net zero contribution to the municipal storm system.
ID.10	Daylighting into spaces	Bring natural light into spaces that are not located on an exterior wall by means of interior glazed wall and/or potentially light tubes.
ID.11	Heat recovery from air exhausts	Classrooms, electrical room, mechanical room, and elevator machine room exhausts may be equipped with an energy recovery coil to recapture lost heat.
ID.12	Air source heat pumps	Utilize hybrid air source heat pumps in HVAC systems. (Considered to be a better alternate to ground source heat pumps for this project.)
ID.13	Potential Living Green Wall	Use growing medium to act as a partition, air purifier and sculpture in the interior west atrium.



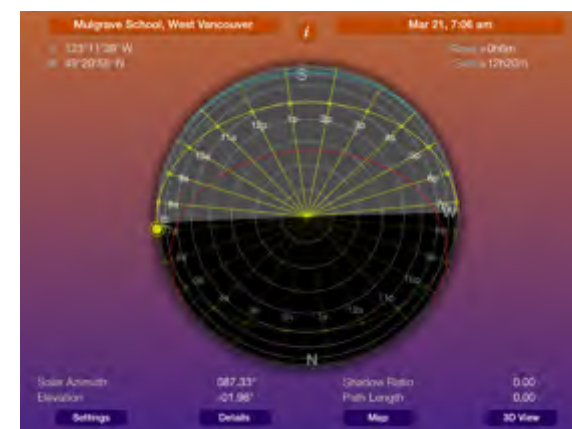
Location and Context Plan



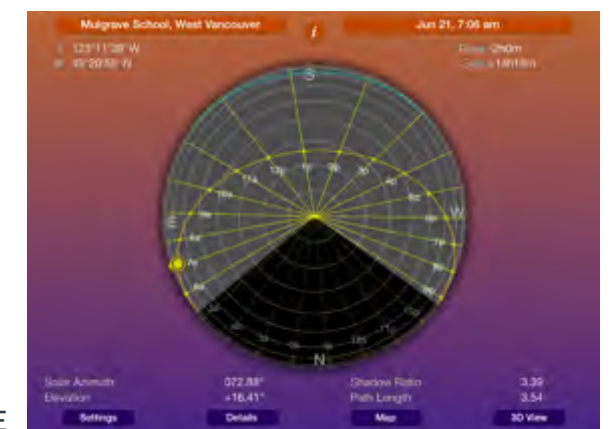
Sun Path Diagrams



DECEMBER



MARCH



JUNE

Project Data and Statistics

Permitted Uses			
Accessory buildings, structures and uses		(Upper Gym)	
Child Care		(Early Learning Centre)	
Combined School		(Grades K-12)	
Site Zoning	PA-1 & R8		
Site Area			
Plan EPP30215	55,162.40m ²		
Total Site Area	55,192.40m ²	5.52 ha	13.64 acres

Setbacks	REQUIRED	PROVIDED
South (front)	9.1m	44.0m
East (side)	by geological setback*	60.6m
West (side)	3.0 m	16.0m
North (rear)	9.1m	23.0m

Floor Area	GROSS
Existing	Square Meters
Main Building	
Lower Main	2908
Upper Main	4919.36
Level 2	3633.53
Level 3	2981.81
Total Main Building	14442.7
Upper Gym Building	487.84
Field House	492.39
Existing Campus Total	15422.93
Proposed	
West Addition	
Lower Main	816
Upper Main	785
Level 2	791
Level 3	71
Total West Addition	2463
East Addition	
Upper Main	1785
Level 2	524
Total East Addition	2309
Proposed Campus Total	22503.93

Site Coverage	Existing	Proposed
Existing School	10395.64	10395.64
Upper Gym	796	796
Future Field House	204	204
Lower Gym(to be demolished)	811.42	
West Addition		816
East Addition		1785
Total Area	12207	13996.64
Coverage Permitted	40%	40%
Coverage Proposed	22%	25.36%

Building Height	Existing	Proposed
	24.8m**	24.8m
Number of Storeys	4	4
Floor and Ceiling Levels		
Top of Roof	241.20m	
Level 3 Ceiling	232.60m	
Level 3	229.60m	
Level 2 Ceiling	228.30m	
Level 2	225.30m	
New Gym Ceiling		218.600m
Upper Main Level Ceiling	224.00m	
Upper Main Level	221.00m	
Lower Main Level Ceiling	219.60m	
Lower Main Level	216.40m	
Covered Parking Level	212.60m	
Finished Site Grades		
Corner A	221.00	
Corner B	231.06	
Corner C	221.10	
Corner D	216.36	

Wall to Window Ratio			
	Window Area	Total Wall Area	Percent
West Addition			
Lower Main	71.8m ²	466.82m ²	15%
Upper Main	175.7m ²	450.53m ²	38%
Level 2	145.4m ²	488.22m ²	29%
Level 3	84.3m ²	152.87m ²	55%
Total	477m²	1558m²	30%
East Addition			
Upper Main	74m ²	803.5m ²	9%
Level 2	121.4m ²	1113.3m ²	11%
Total	195.4m²	1916.8m²	10%

Off-Street Parking				
***Number of parking stalls required 99				
Distribution of Parking Stalls	Total	Regular	Small	Accessible
North Parking Lot	29	28		1
South Parking Lot	42	41		1
Covered Parking Area	156	103	52	1
Total Provided	227	172	52	3
School Bus Loading Spaces required	3			
Provided	3			

Mulgrave School Campus Statistics - May 2015			
	Current	Projected Increase	Total
Number of ELC Students	75	5	80
Number of Junior School Students	421	0	421
Number of Middle School Students	189	0	189
Number of Senior School Students	225	0	225
Total Number of Students	910	5	915
Number of Teaching Staff	105	0	105
Number of Admin. Staff	38	0	38
Total Number of Staff	143	0	143
Number of Part Time Support Staff	10	0	10
Number of Part Time Volunteers	25	0	25
Total Support/Volunteers	35	0	35
Total School Population	1088	5	1093
Number of Staff Parking	120	0	120
Number of Student Parking	20-45	0	20-45
Visitor Parking	32		
ELC Parking	20		

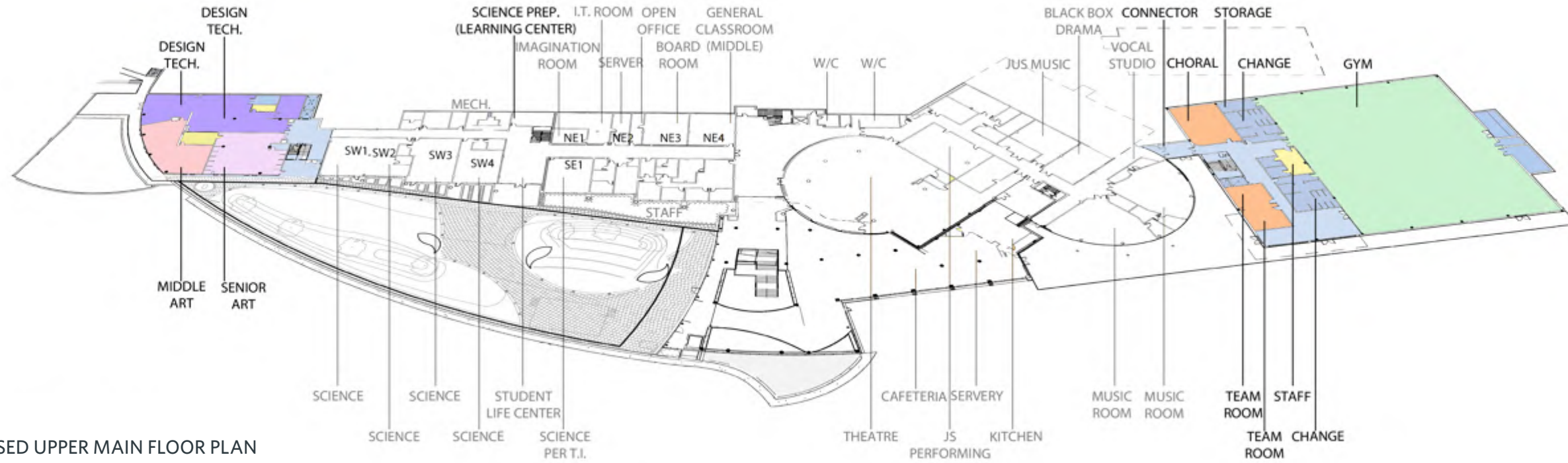
Daily Deliveries: 2 long base 10 ton trucks (Coca Cola, Sysco)
4 short base 4 ton delivery trucks
8 delivery vans/cars

Three times per week: Garbage pick-up
Once per week: Organic recycling pick-up
Bi-weekly: Paper/Cardboard recycling pick-up
Special Events: Misc. delivery vans/cars (December, May, June)

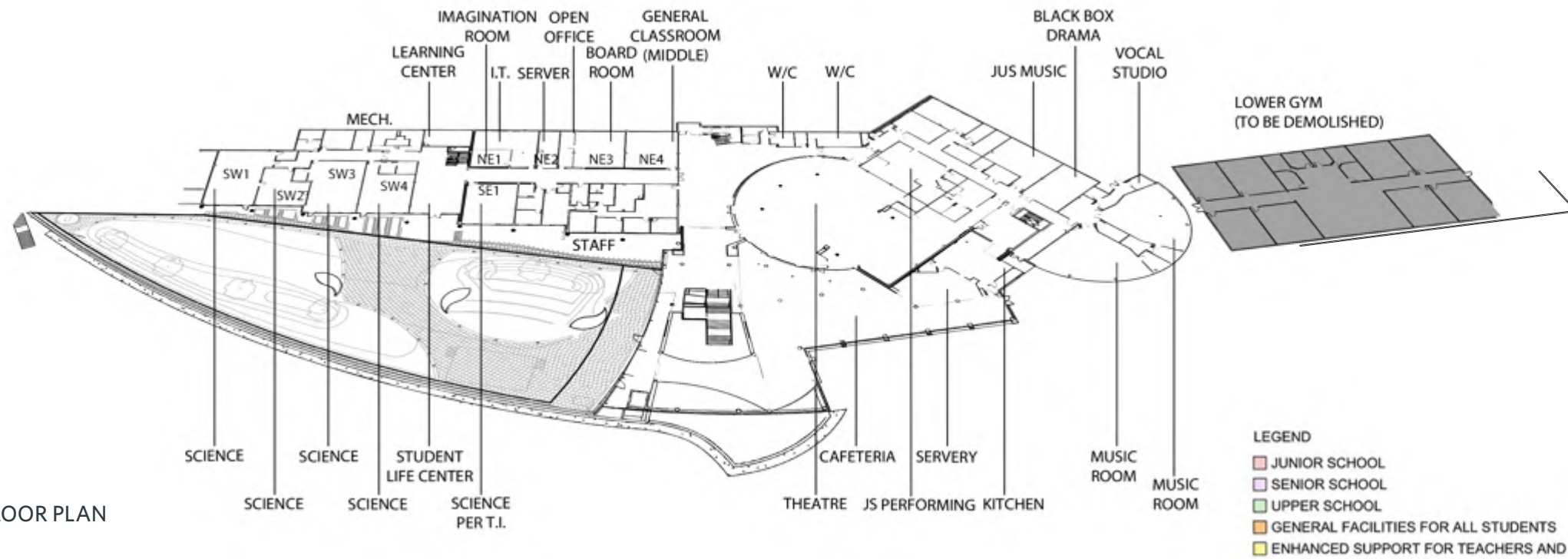
Note: Deliveries include food, drinks, books, papers, furniture, cleaning products, school supplies, and rentals, Deliveries are restricted between 7:30 - 9:00 am and 2:00 pm - 4:00 pm.
Majority of small deliveries occur between 9:00 am - 2:00 pm.
The larger deliver trucks usually arrive between 12:00 am -2:00 pm.
Garbage/recycling pick-up generally occurs between 10:00 am - 2:00 pm.
Start/end times junior school 8:15am / 3:15 pm
Start/end times middle school 8:30am / 3:30 pm
Start/end times senior school 8:30am / 3:30 pm

NOTES
*The geological setback varies yet exceeded the minimum side yard setback per 560.07 (1) and (2)
**The existing building was approved with 4 storeys
***Requirement per section 560.1 (3) is 1.25 spaces / classroom + 1 per 10 students in grades 11 and 12.
The total requirement is based on 150 students and 59 permanent classrooms

Mulgrave School Classroom Rearrangement By Floor

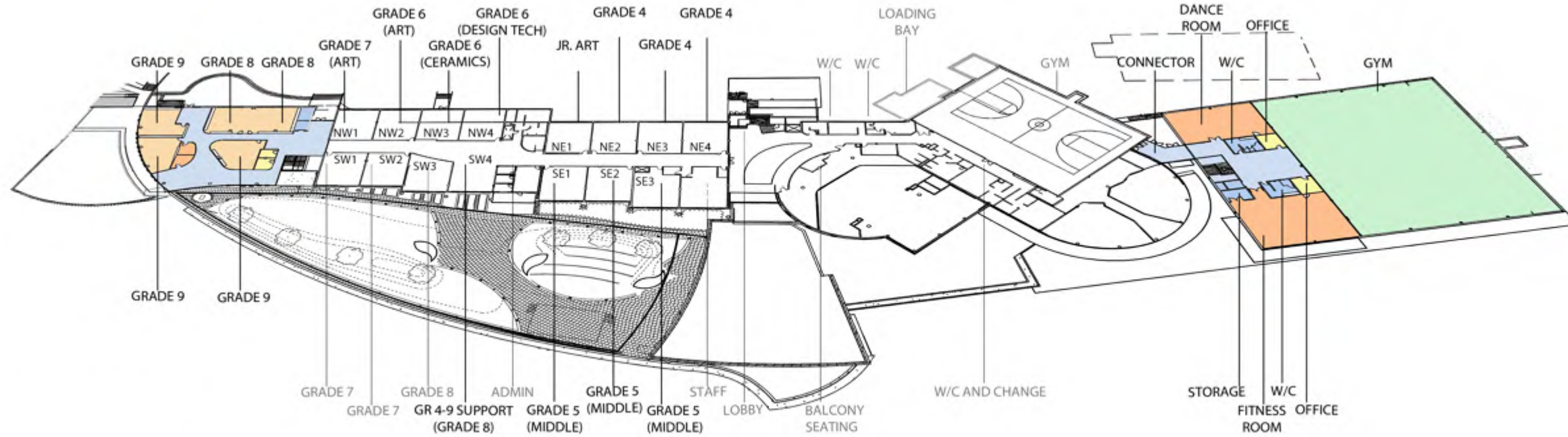


PROPOSED UPPER MAIN FLOOR PLAN

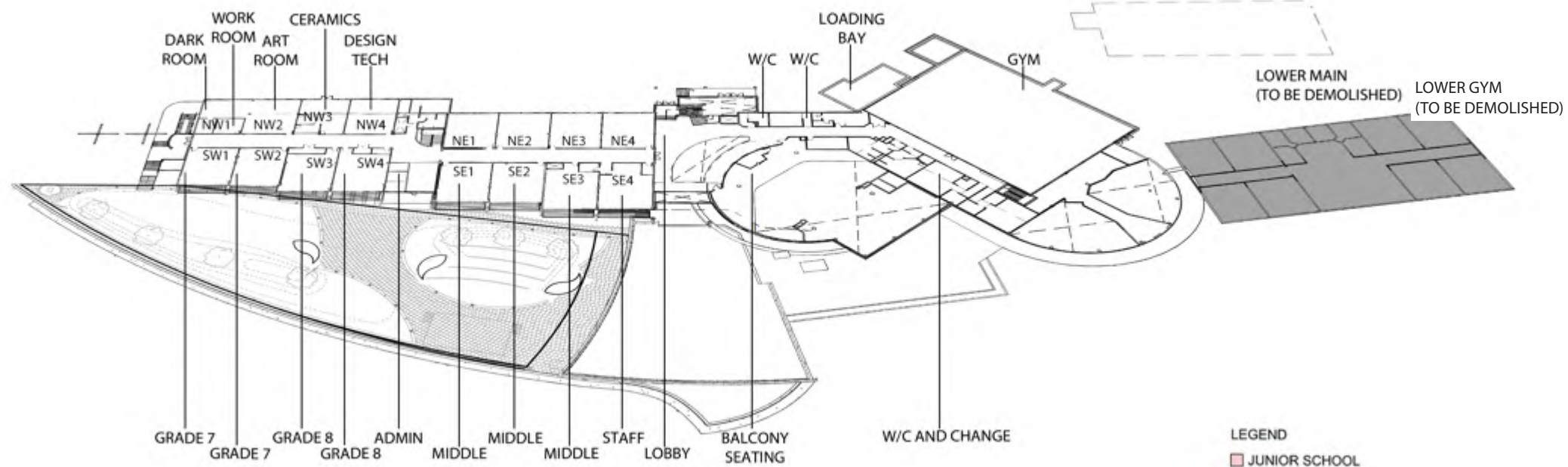


EXISTING UPPER MAIN FLOOR PLAN

Mulgrave School Classroom Rearrangement By Floor



PROPOSED LEVEL 2 FLOOR PLAN

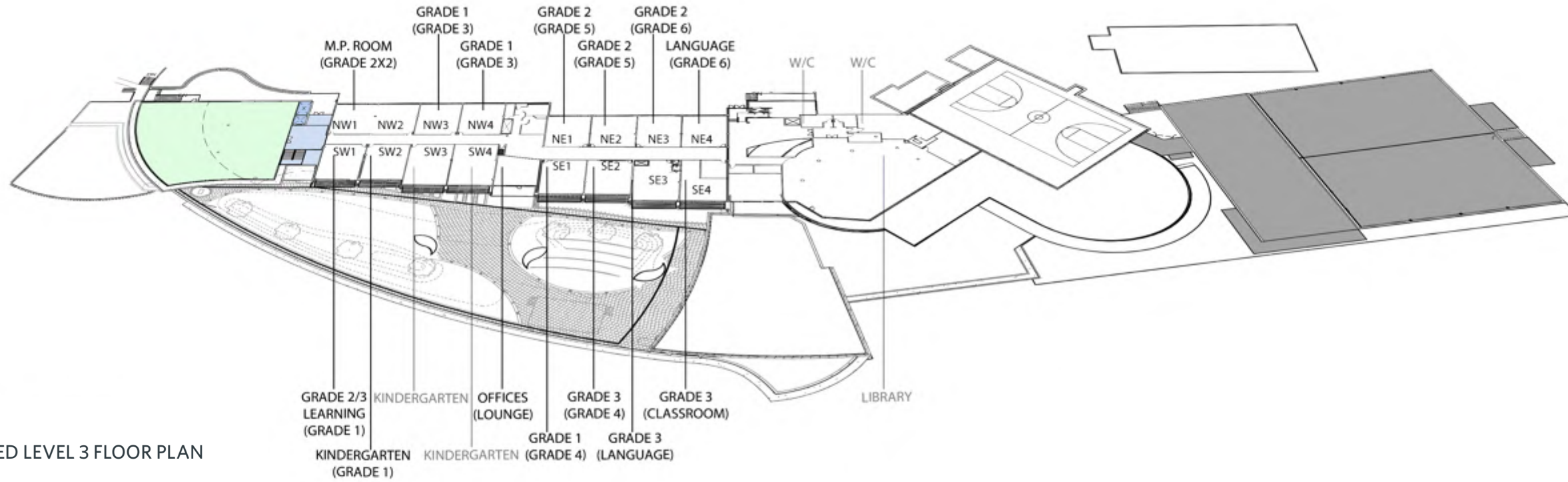


EXISTING LEVEL 2 FLOOR PLAN

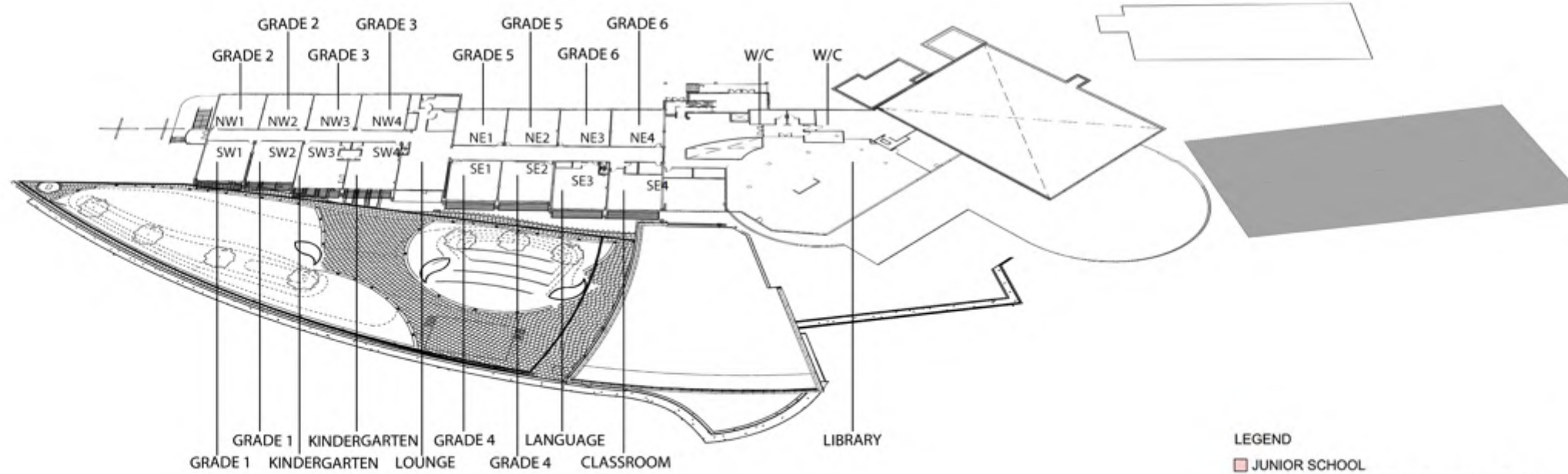
- LEGEND
- JUNIOR SCHOOL
 - MIDDLE SCHOOL
 - GENERAL FACILITIES FOR ALL STUDENTS
 - ENHANCED SUPPORT FOR TEACHERS AND STAFF
 - CIRCULATION
 - SERVICE SPACES
 - OUTDOOR
 - OUTDOOR CIRC

Mulgrave School Classroom Rearrangement By Floor

PROPOSED LEVEL 3 FLOOR PLAN



EXISTING LEVEL 3 FLOOR PLAN



3.0 Drawings



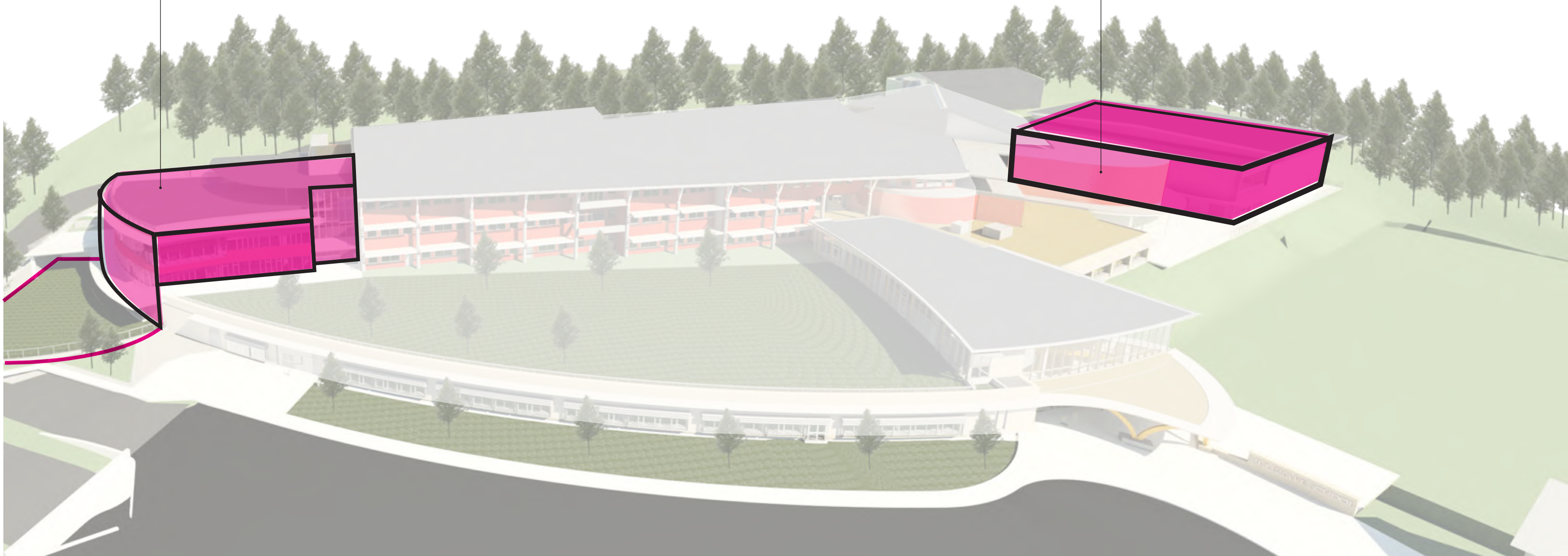
Existing



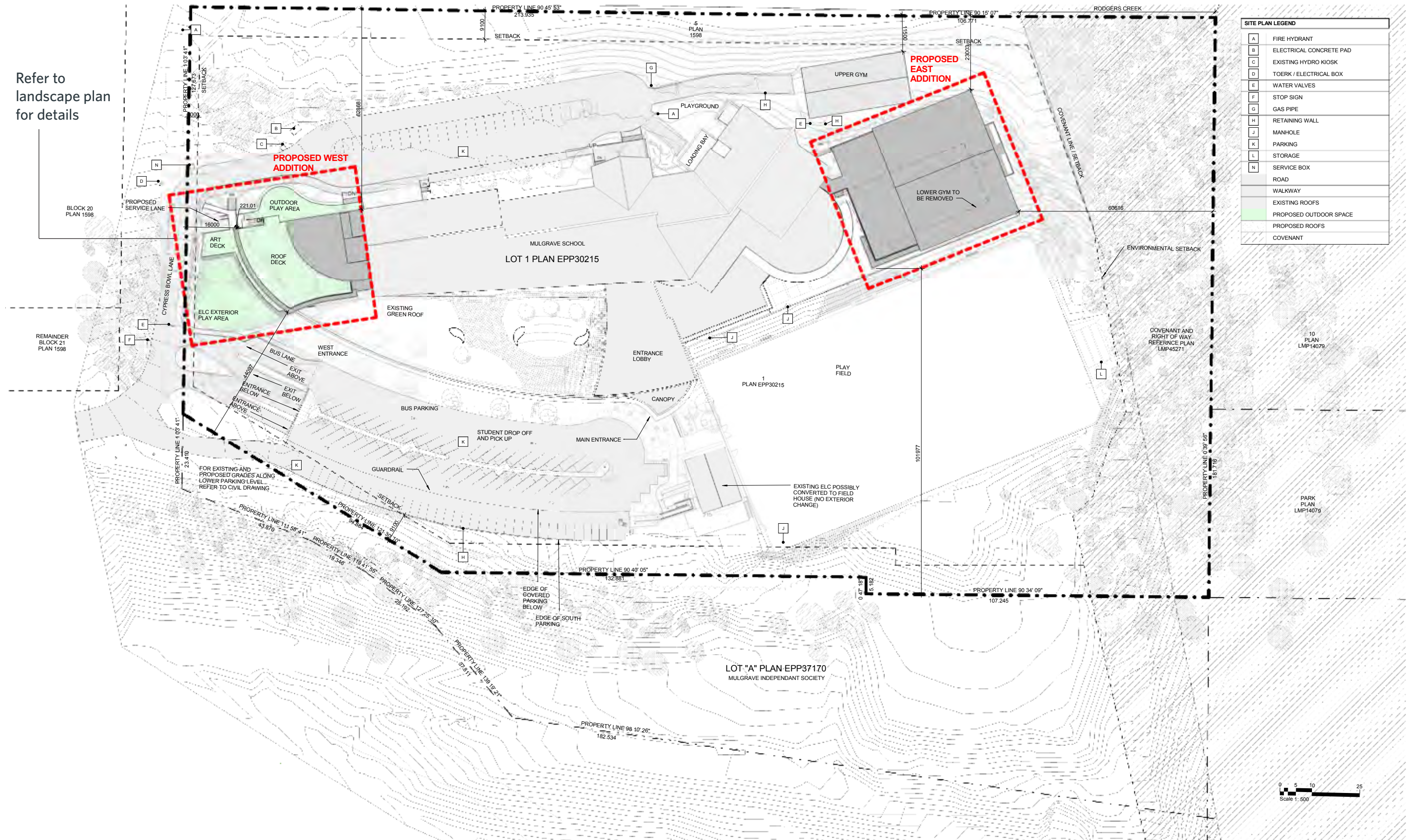
Proposed

West Addition

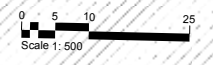
East Addition



Refer to
landscape plan
for details



SITE PLAN LEGEND	
A	FIRE HYDRANT
B	ELECTRICAL CONCRETE PAD
C	EXISTING HYDRO KIOSK
D	TOERK / ELECTRICAL BOX
E	WATER VALVES
F	STOP SIGN
G	GAS PIPE
H	RETAINING WALL
J	MANHOLE
K	PARKING
L	STORAGE
N	SERVICE BOX
	ROAD
	WALKWAY
	EXISTING ROOFS
	PROPOSED OUTDOOR SPACE
	PROPOSED ROOFS
	COVENANT

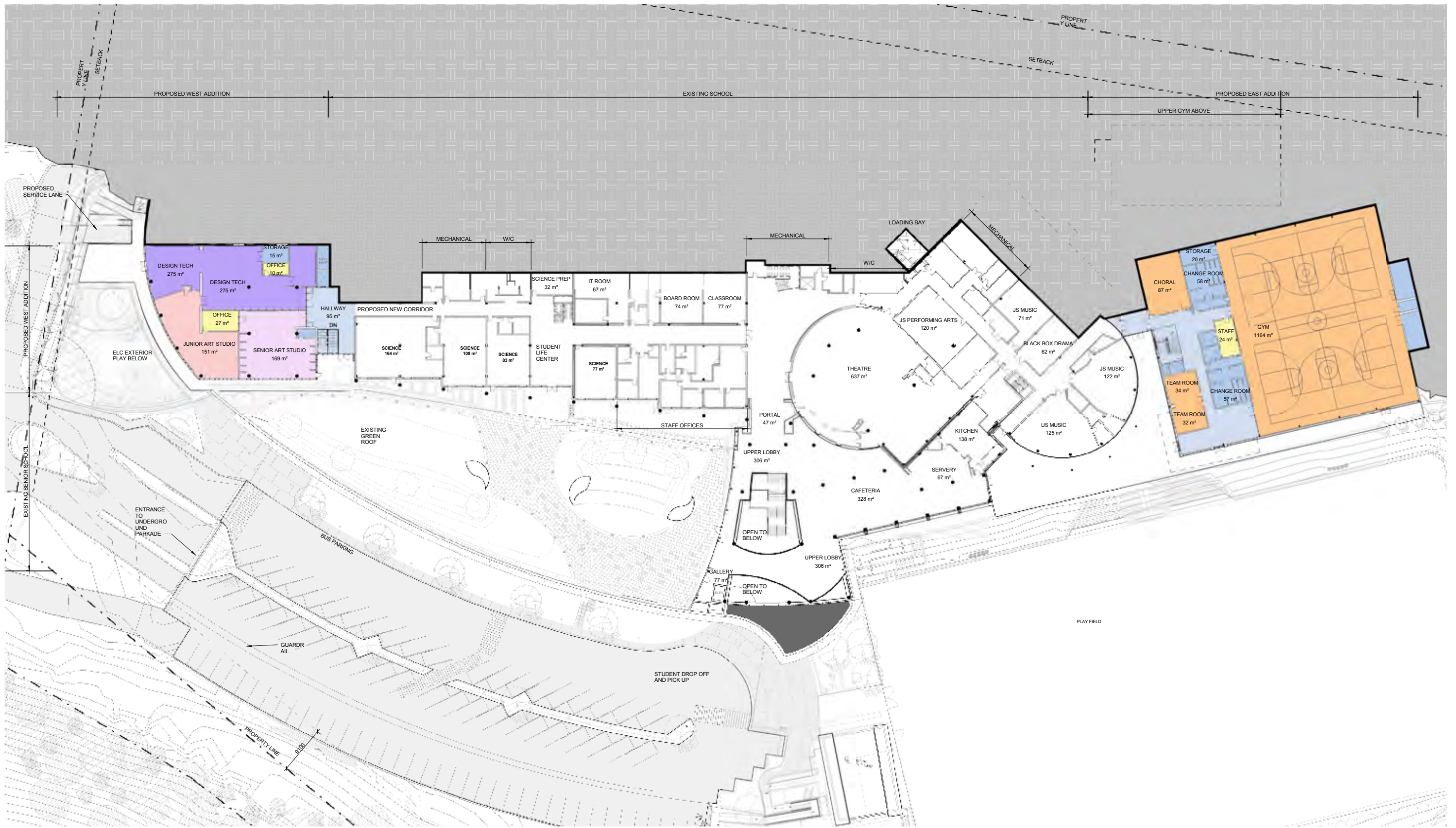




- LEGEND
- ELC/ CHILDCARE
 - GENERAL FACILITIES FOR ALL STUDENTS
 - ENHANCED SUPPORT FOR TEACHERS AND STAFF
 - CIRCULATION
 - SERVICE SPACES
 - OUTDOOR

Mulgrave School - Phase 2

OVERALL-LOWER LEVEL PLAN CEI

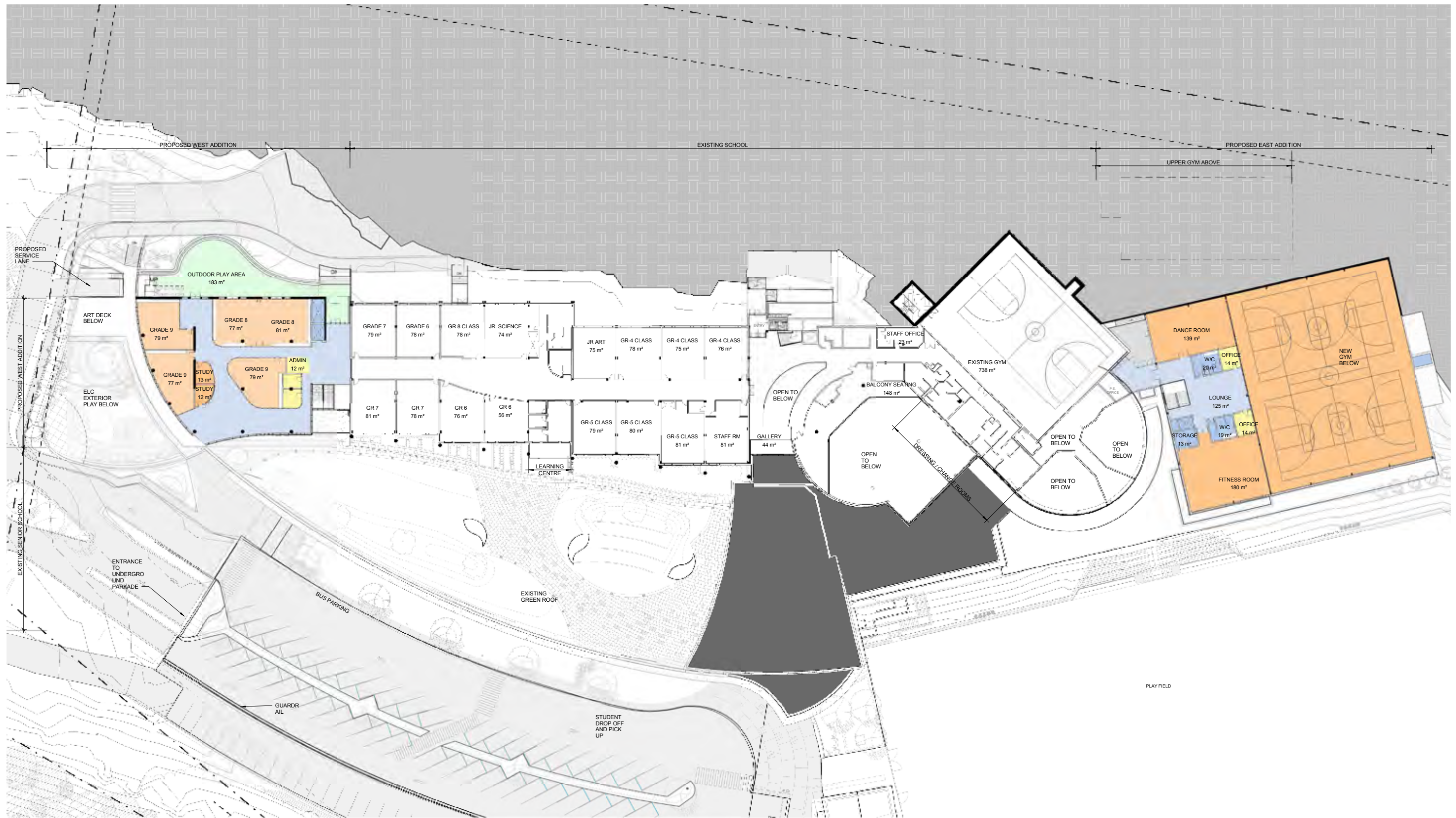


- LEGEND
- JUNIOR SCHOOL
 - SENIOR SCHOOL
 - GENERAL FACILITIES FOR ALL STUDENTS
 - ENHANCED SUPPORT FOR TEACHERS AND STAFF
 - COMMUNITY ROOMS AND MVP SHOP
 - CIRCULATION
 - SERVICE SPACES



Mulgrave School - Phase 2

OVERALL - UPPER LEVEL PLAN CEI

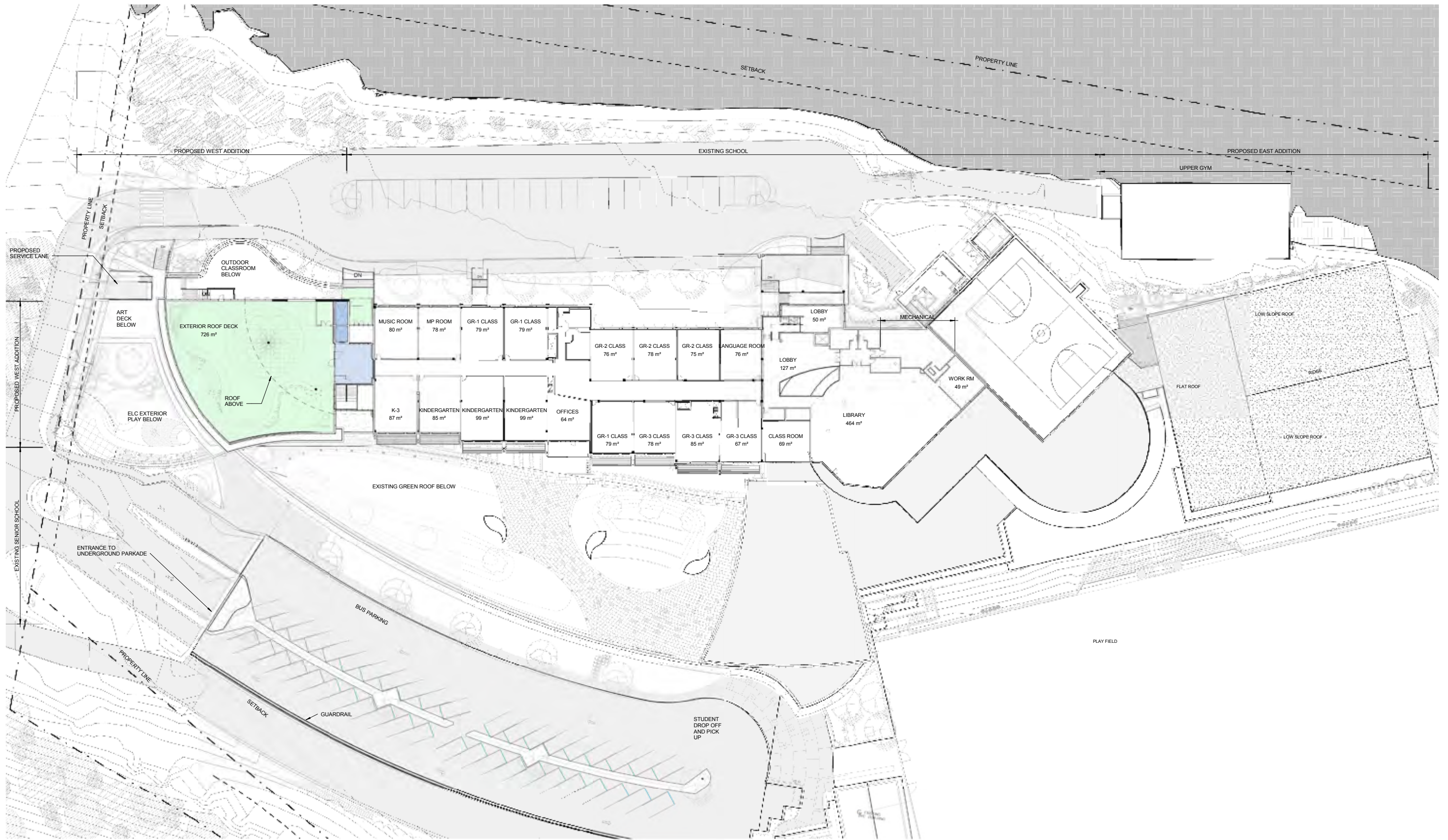


- LEGEND
- MIDDLE SCHOOL
 - SERVICE SPACES
 - GENERAL FACILITIES FOR ALL STUDENTS
 - OUTDOOR
 - ENHANCED SUPPORT FOR TEACHERS AND STAFF
 - OUTDOOR CIRC
 - CIRCULATION



Mulgrave School - Phase 2

OVERALL - LEVEL 2 PLAN CEI



- LEGEND
- CIRCULATION
 - SERVICE SPACES
 - OUTDOOR
 - OUTDOOR CIRC



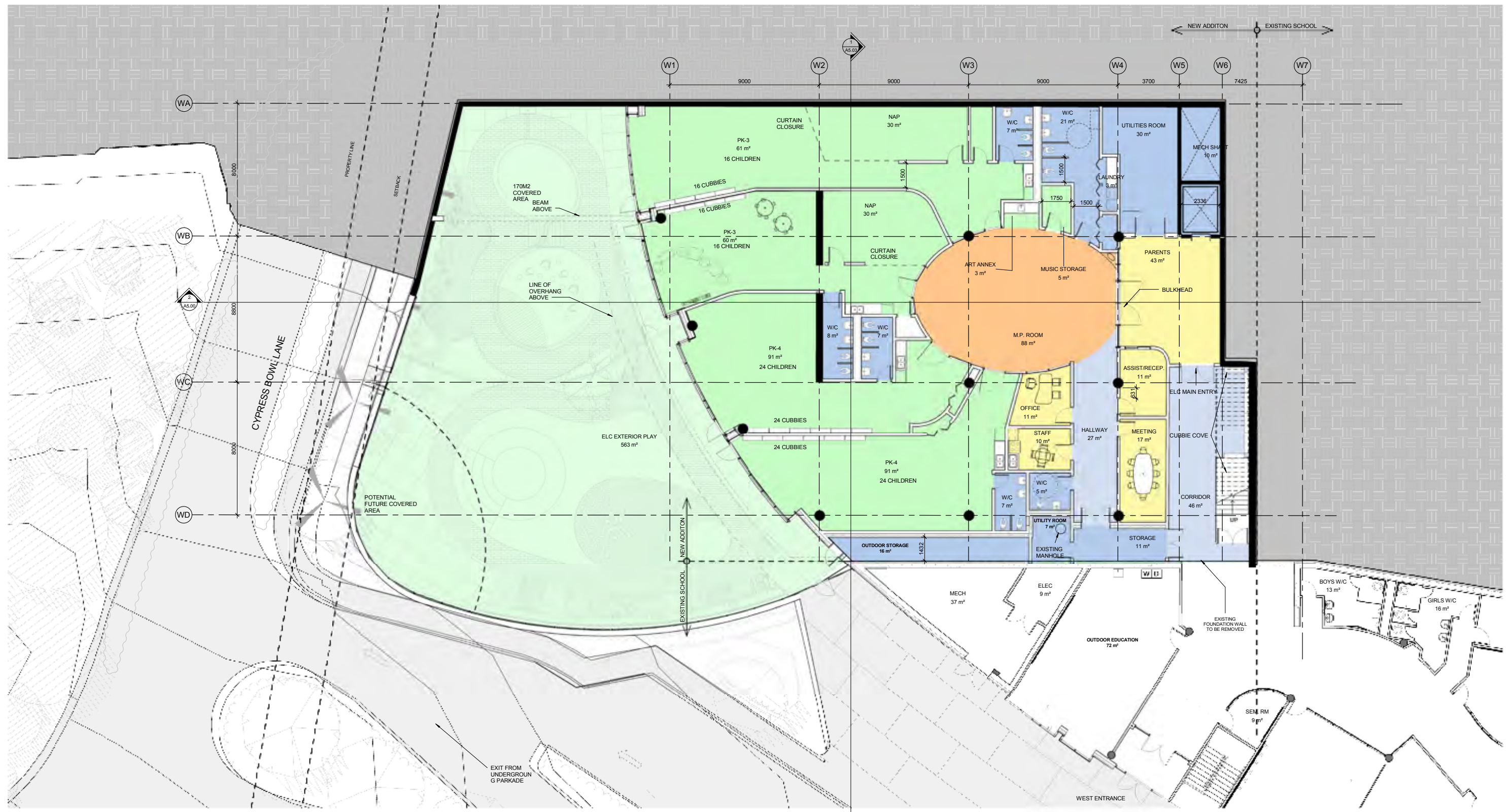
Mulgrave School - Phase 2

OVERALL - LEVEL 3 PLAN



Mulgrave School - Phase 2

OVERALL - LEVEL ROOF PLAN 

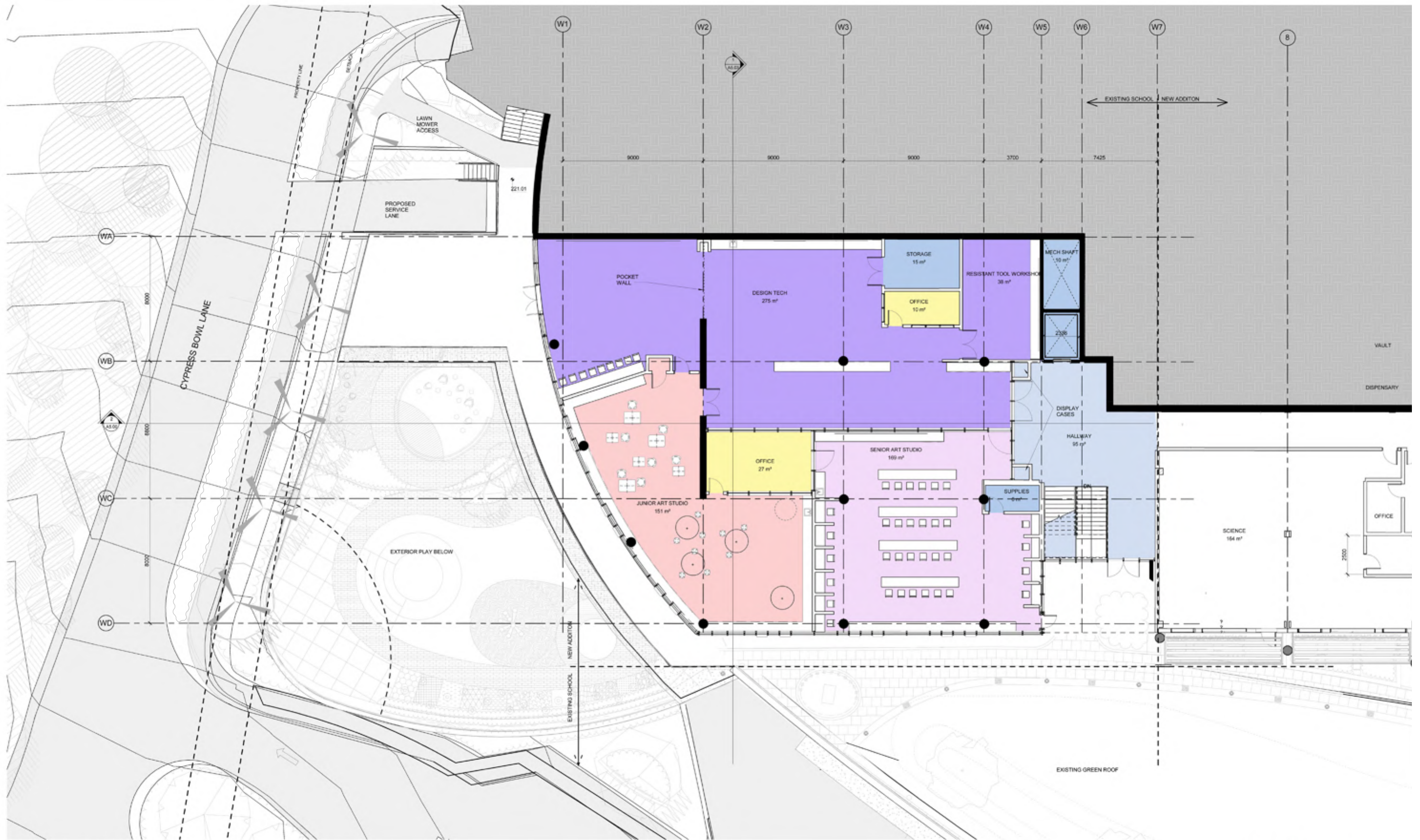


1 LOWER MAIN PLAN
A2.05 SCALE: 1:100



Mulgrave School - Phase 2

WEST ADDITION - LOWER MAIN FLOOR PLAN CEI

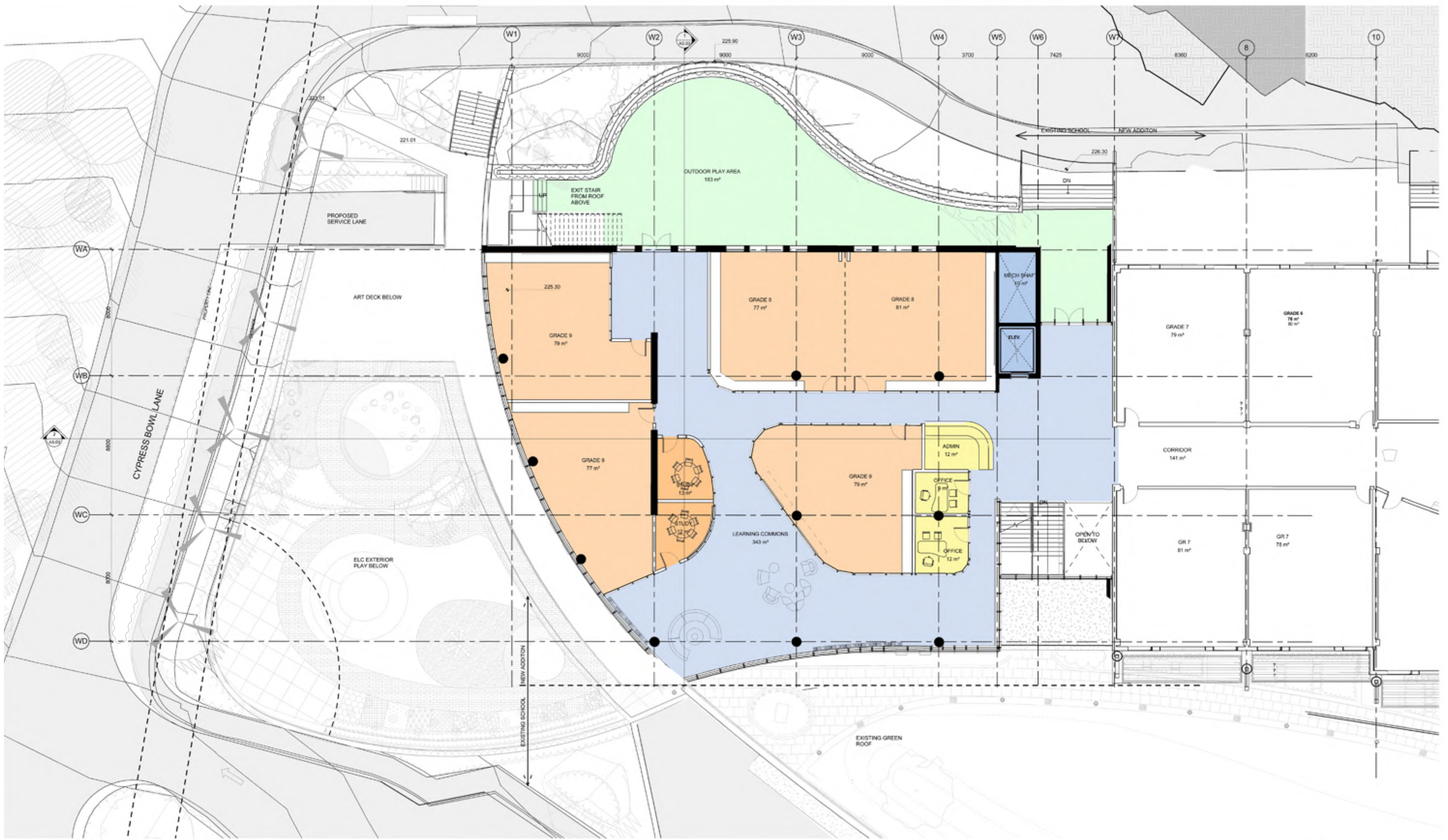


1 UPPER MAIN PLAN
A2.06 SCALE: 1:100



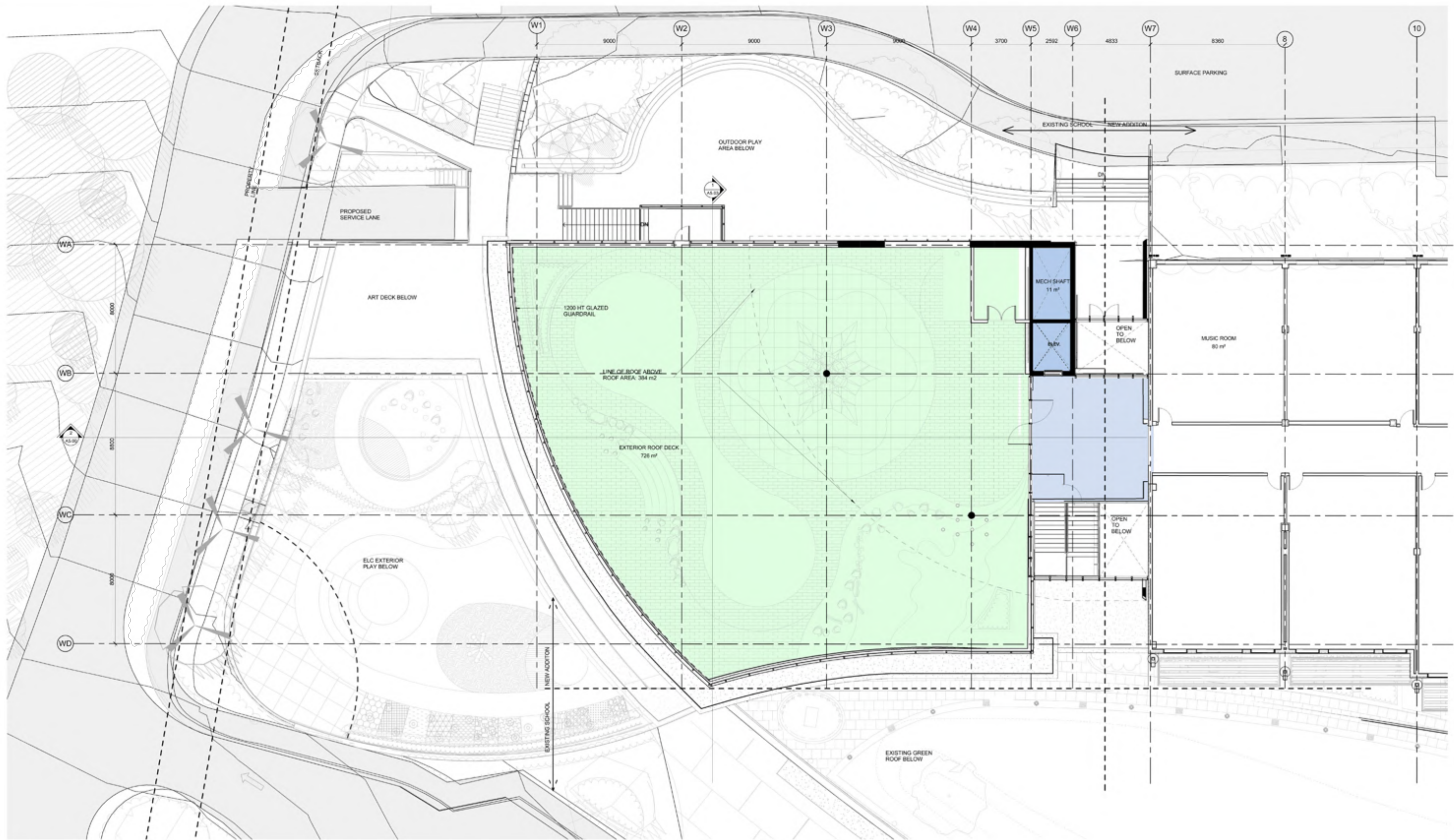
Mulgrave School - Phase 2

WEST ADDITION - UPPER MAIN FLOOR PLAN CEI



1 | Level 2-West Addition-DD
 A2.07 | SCALE: 1:500



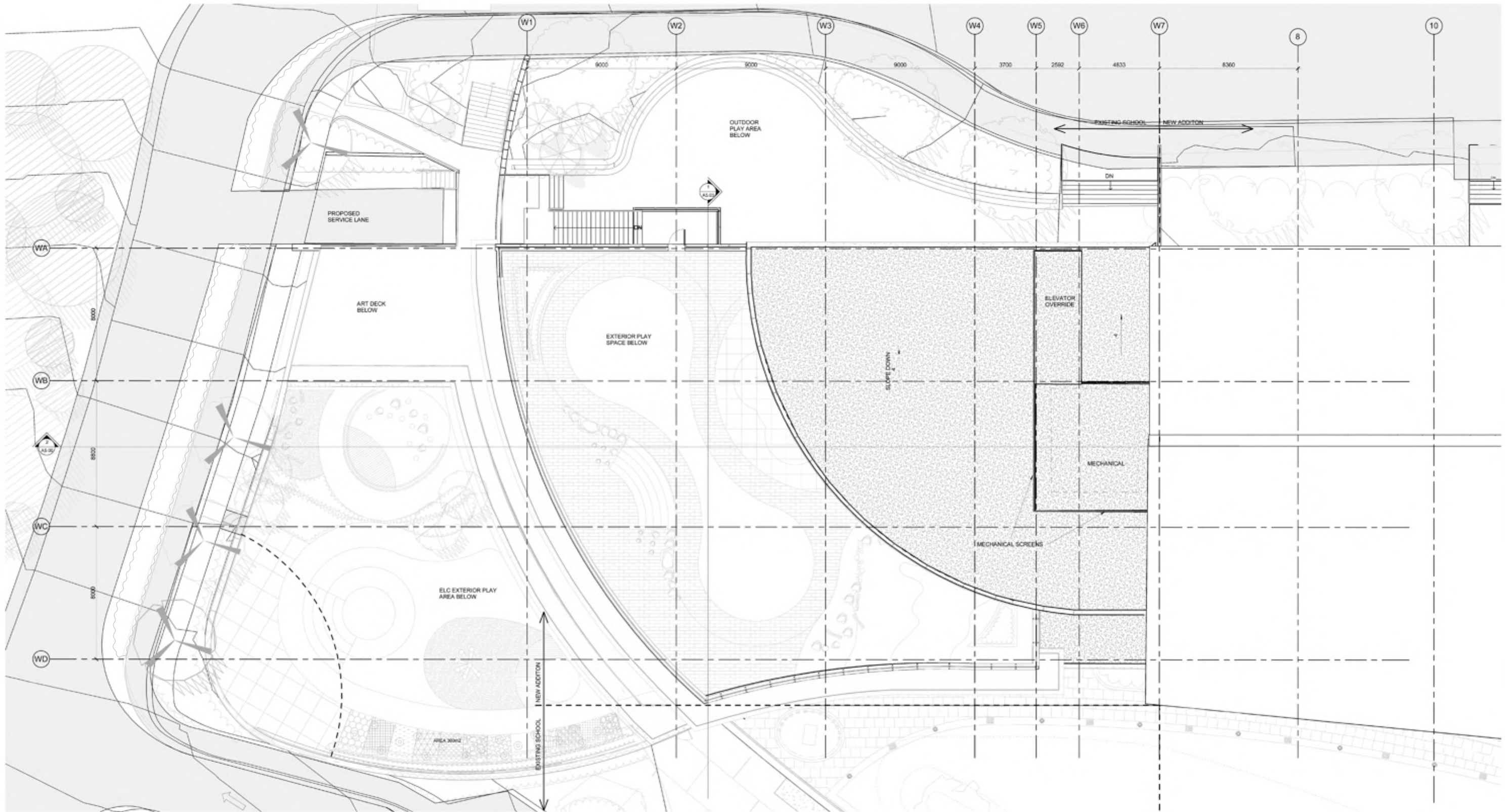


1 Level 3-West Addition-DD
A2.08 SCALE: 1:100



Mulgrave School - Phase 2

WEST ADDITION - LEVEL 3 FLOOR PLAN

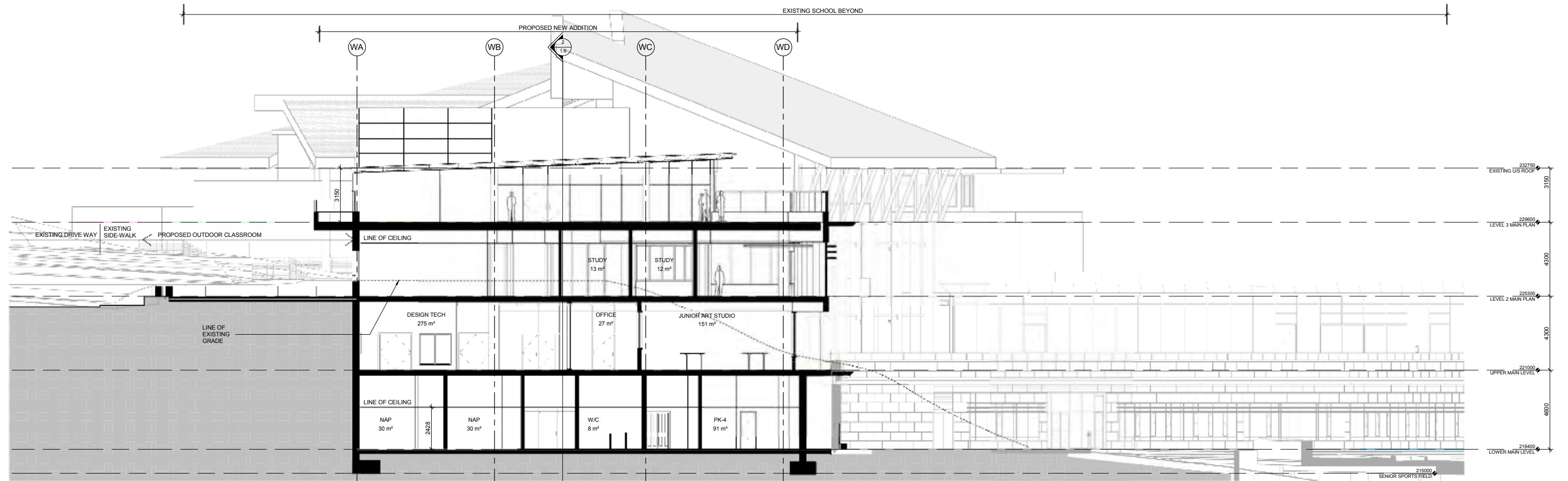


1 | Roof Level-West Addition-DD
 A2.09 | SCALE: 1:100

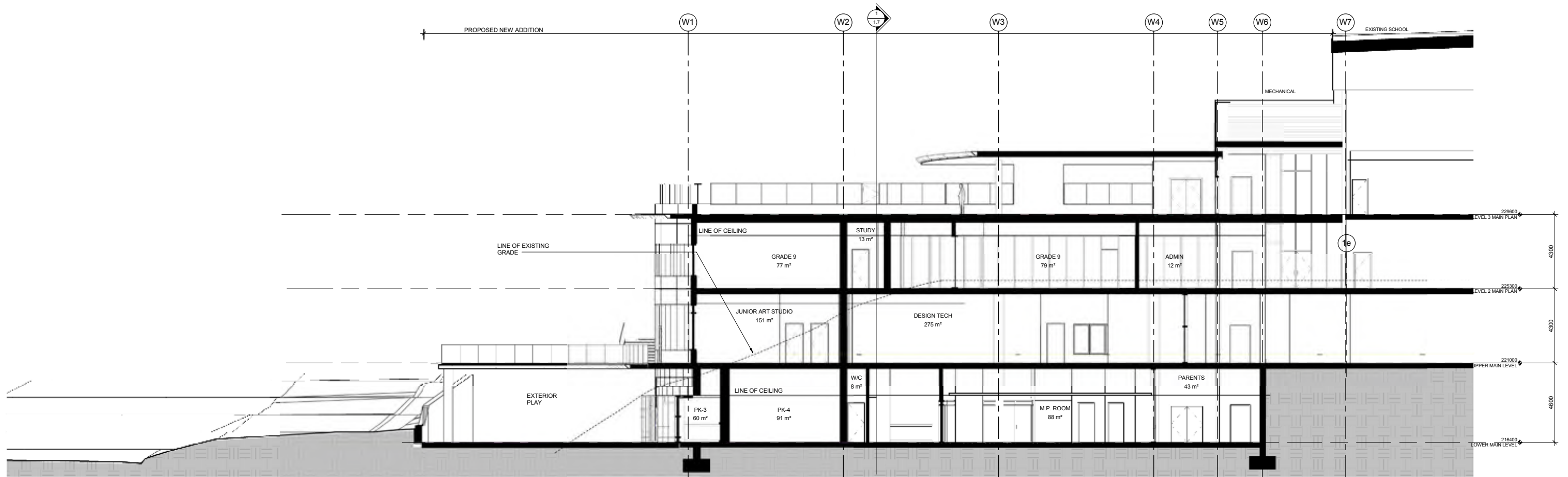


Mulgrave School - Phase 2

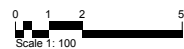
WEST ADDITION - ROOF PLAN CEI



1 WEST SECTION NS
 1.7 SCALE: 1:100
 Scale 1:200

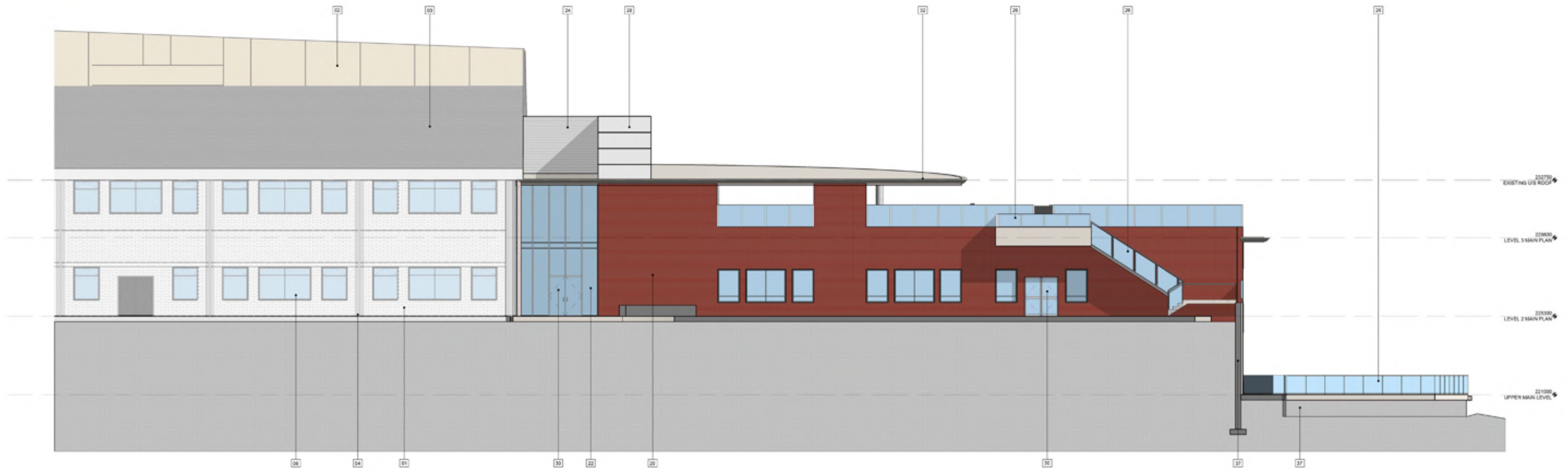


2 WEST SECTION EW
1.6 SCALE: 1:100



Mulgrave School - Phase 2

WEST ADDITION LONGITUDINAL SECTION



1 Elevation 1 - a
A4.00 SCALE: 1:100



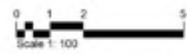
2 W NORTH ELEVATION KEYPLAN
A4.00 SCALE: 1:500

MATERIALS LEGEND

01	EXISTING BRICK	11	EXISTING METAL LOUVER	21	SUNSHADE	31	CAPTURED CURTAIN WALL OPERABLE UNITS
02	EXISTING FIBER CEMENT PANELS	12	EXISTING PAINTED STEEL FASCIA	22	CURTAIN WALL GLAZING W/ VERTICAL CAPS	32	PAINTED CONCRETE CANOPY
03	EXISTING ROOF	13	PREFINISHED ALUMINUM FASCIA	23	4 SIDED CAPTURED CURTAIN WALL GLAZING	33	PAINTED METAL DOOR
04	EXISTING CONCRETE COLUMN	14	EXISTING GLAZED ENTRANCE DOOR	24	LOUVERED MECHANICAL SCREEN	34	GLAZED STOREFRONT BAY W/ COLOURED ACCENT PANELS
05	EXISTING CONCRETE MASONRY UNITS	15	EXPOSED ARCHITECTURAL CONCRETE	25	2 PLY SBS MEMBRANE ROOFING - COLOUR LIGHT GREY	35	CONCRETE BEAM
06	EXISTING ALUMINUM FRAMED WINDOWS	16	EXISTING BOX WINDOW GW HORIZONTAL SUNSHADES	26	GLAZED GUARDRAIL IN ALUMINUM FRAME	36	ALUMINUM PANELS
07	EXISTING STONE CLADDING	17	EXISTING METAL PANEL	27	METAL ACCENT PANELS	37	CONCRETE RETAINING WALL
08	EXISTING CURTAINWALL GLAZING	18	EXISTING GLAZED GUARDRAIL	28	METAL CLADDING	38	EXPOSED CONCRETE COLUMN
09	EXISTING HORIZONTAL SUNSHADE	19	STONE CLADDING	29	PUNCHED ALUMINUM FRAME WINDOWS	39	INSULATED SANDWICH PANEL SANDCOLOR FINISH
10	EXISTING PREFINISHED ALUMINUM FASCIA	20	BRICK CLADDING	30	GLAZED ENTRANCE DOOR W/ ALUMINUM FRAME	40	INSULATED SANDWICH PANEL SILVER FINISH



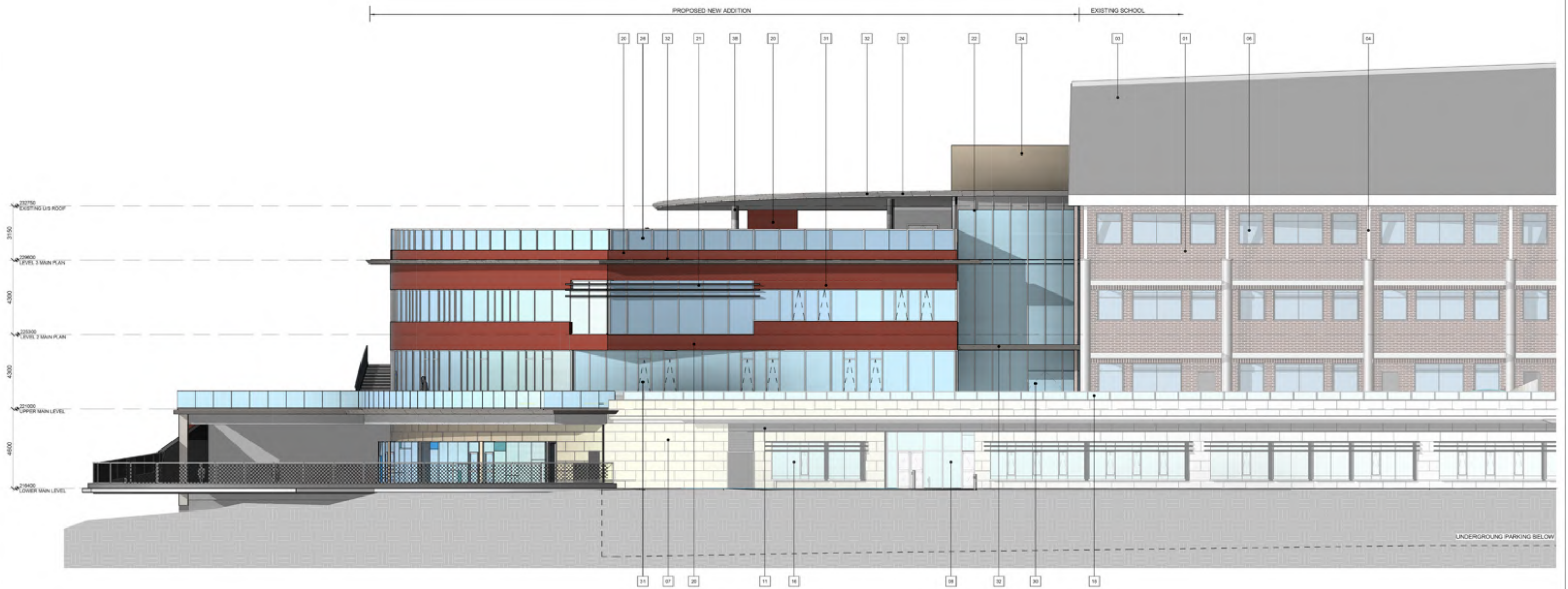
1 West-West Addition-WK
A4.01 SCALE: 1:100



2 WEST ELEVATION KEY PLAN
A4.01 SCALE: 1:500

MATERIALS LEGEND

01	EXISTING BRICK	11	EXISTING METAL LOUVER	21	SUNSHADE	31	CAPTURED CURTAIN WALL OPERABLE UNITS
02	EXISTING FIBER CEMENT PANELS	12	EXISTING PAINTED STEEL FASCIA	22	CURTAIN WALL GLAZING W/ VERTICAL CAPS	32	PAINTED CONCRETE CANOPY
03	EXISTING ROOF	13	PREFINISHED ALUMINUM FASCIA	23	4 SIDED CAPTURED CURTAIN WALL GLAZING	33	PAINTED METAL DOOR
04	EXISTING CONCRETE COLUMN	14	EXISTING GLAZED ENTRANCE DOOR	24	LOUVERED MECHANICAL SCREEN	34	GLAZED STOREFRONT BAY W/ COLOURED ACCENT PANELS
05	EXISTING CONCRETE MASONRY UNITS	15	EXPOSED ARCHITECTURAL CONCRETE	25	2 PLY SBS MEMBRANE ROOFING - COLOUR LIGHT GREY	35	CONCRETE BEAM
06	EXISTING ALUMINUM FRAMED WINDOWS	16	EXISTING BRICK WINDOW C/W HORIZONTAL SUNSHADES	26	GLAZED GUARDRAIL IN ALUMINUM FRAME	36	ALUMINUM PANELS
07	EXISTING STONE CLADDING	17	EXISTING METAL PANEL	27	METAL ACCENT PANELS	37	CONCRETE RETAINING WALL
08	EXISTING CURTAINWALL GLAZING	18	EXISTING GLAZED GUARDRAIL	28	METAL CLADDING	38	EXPOSED CONCRETE COLUMN
09	EXISTING HORIZONTAL SUNSHADE	19	STONE CLADDING	29	PUNCHED ALUMINUM FRAME WINDOWS	39	INSULATED SANDWICH PANEL SANDCOLOR FINISH
10	EXISTING PREFINISHED ALUMINUM FASCIA	20	BRICK CLADDING	30	GLAZED ENTRANCE DOOR W/ ALUMINUM FRAME	40	INSULATED SANDWICH PANEL SILVER FINISH



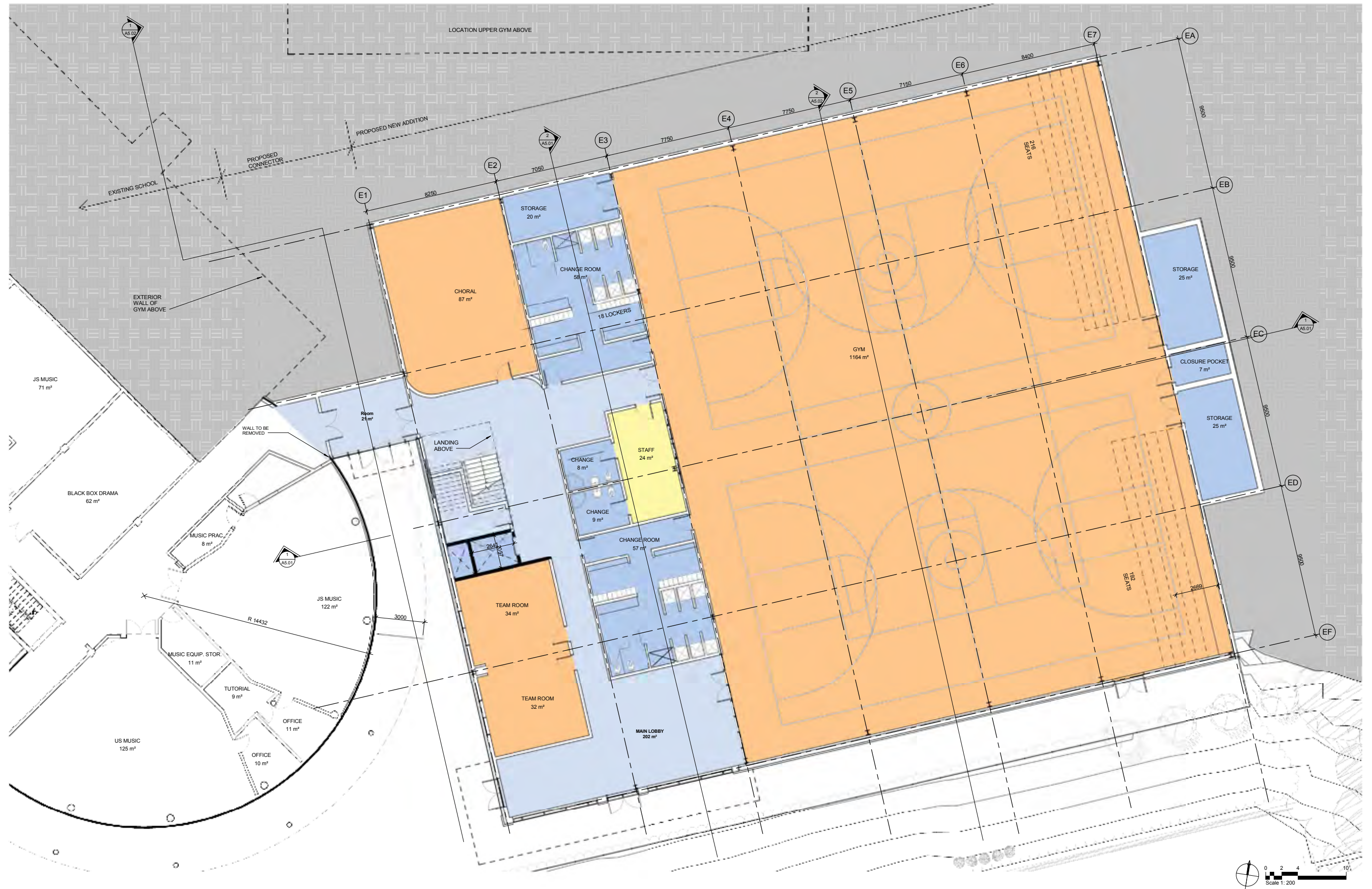
1 South-West Addition-WK
A4.02 SCALE: 1:100

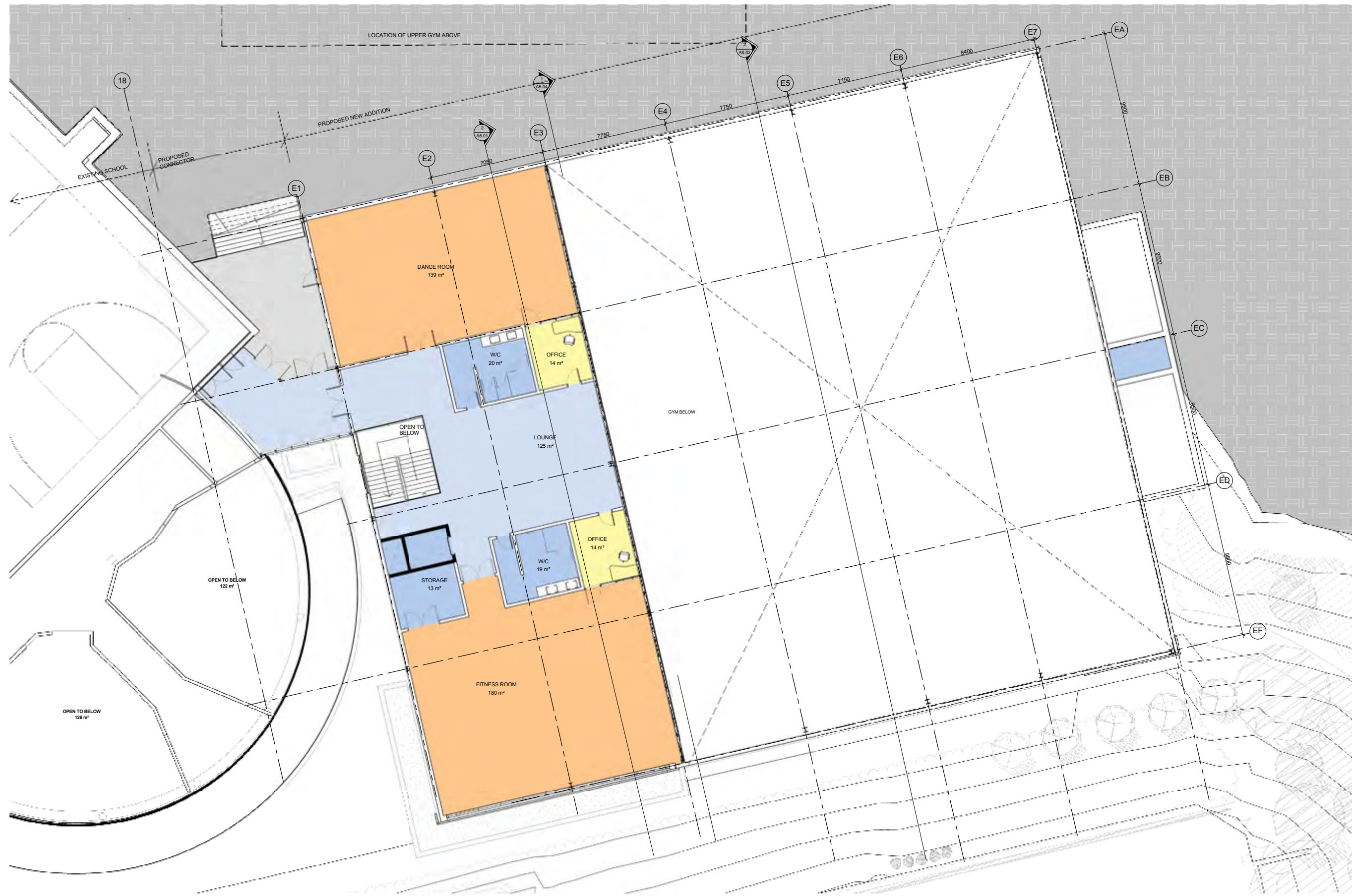


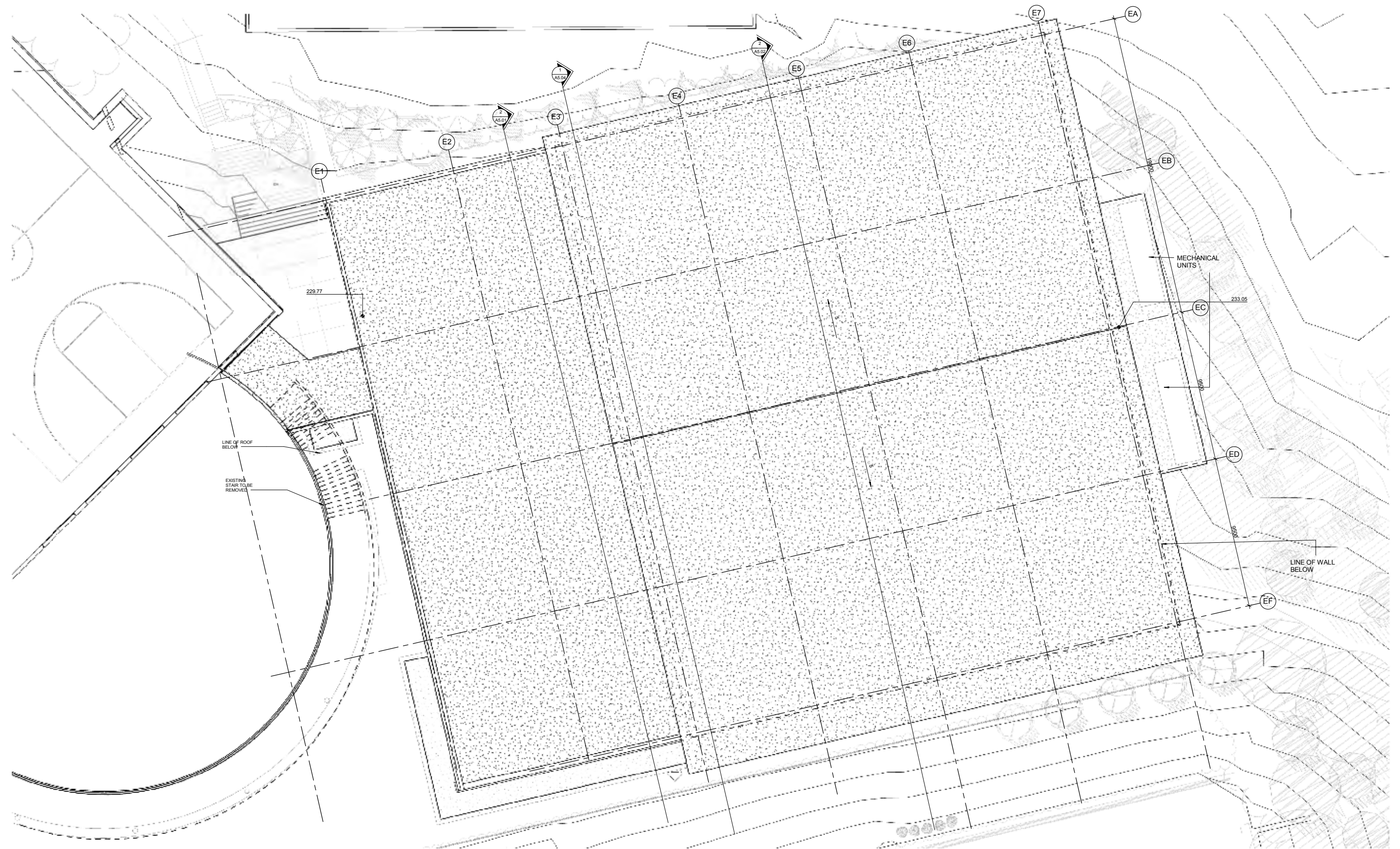
2 W SOUTH ELEVATION KEYPLAN
A4.02 SCALE: 1:100

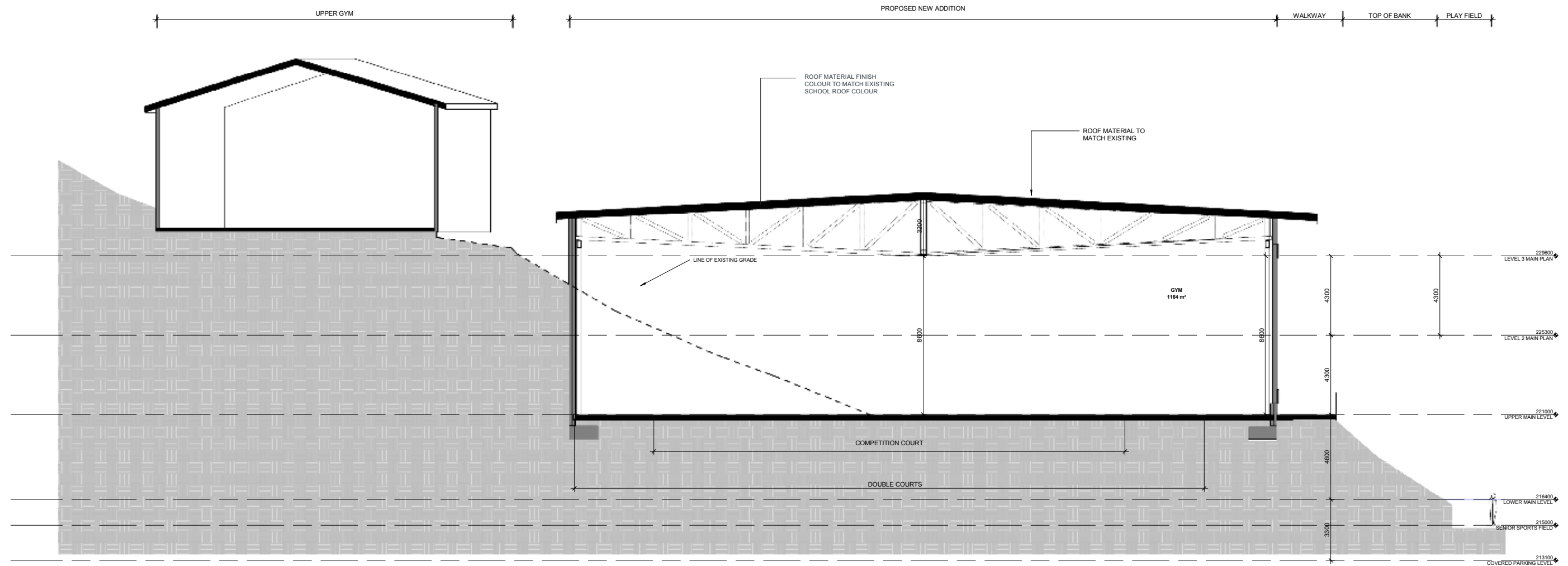
MATERIALS LEGEND

- | | | | | | | | |
|----|--------------------------------------|----|---|----|--|----|---|
| 01 | EXISTING BRICK | 11 | EXISTING METAL LOUVER | 21 | SUNSHADE | 31 | CAPTURED CURTAIN WALL OPERABLE UNITS |
| 02 | EXISTING FIBER CEMENT PANELS | 12 | EXISTING PAINTED STEEL FASCIA | 22 | CURTAIN WALL GLAZING W/ VERTICAL CAPS | 32 | PAINTED CONCRETE GANVOFF |
| 03 | EXISTING ROOF | 13 | PREFINISHED ALUMINUM FASCIA | 23 | 4 SIDED CAPTURED CURTAIN WALL GLAZING | 33 | PAINTED METAL DOOR |
| 04 | EXISTING CONCRETE COLUMN | 14 | EXISTING GLAZED ENTRANCE DOOR | 24 | LOUVERED MECHANICAL SCREEN | 34 | GLAZED STOREFRONT BAY W/ COLOURED ACCENT PANELS |
| 05 | EXISTING CONCRETE MASONRY UNITS | 15 | EXPOSED ARCHITECTURAL CONCRETE | 25 | 2 PLY SBS MEMBRANE ROOFING - COLOUR LIGHT GREY | 35 | CONCRETE BEAM |
| 06 | EXISTING ALUMINUM FRAMED WINDOWS | 16 | EXISTING BOX WINDOW CW HORIZONTAL SUNSHADES | 26 | GLAZED GUARDRAIL IN ALUMINUM FRAME | 36 | ALUMINUM PANELS |
| 07 | EXISTING STONE CLADDING | 17 | EXISTING METAL PANEL | 27 | METAL ACCENT PANELS | 37 | CONCRETE RETAINING WALL |
| 08 | EXISTING CURTAINWALL GLAZING | 18 | EXISTING GLAZED GUARDRAIL | 28 | METAL CLADDING | 38 | EXPOSED CONCRETE COLUMN |
| 09 | EXISTING HORIZONTAL SUNSHADE | 19 | STONE CLADDING | 29 | PUNCHED ALUMINUM FRAME WINDOWS | 39 | INSULATED SANDWICH PANEL SANDCOLOR FINISH |
| 10 | EXISTING PREFINISHED ALUMINUM FASCIA | 20 | BRICK CLADDING | 30 | GLAZED ENTRANCE DOOR W/ ALUMINUM FRAME | 40 | INSULATED SANDWICH PANEL SILVER FINISH |



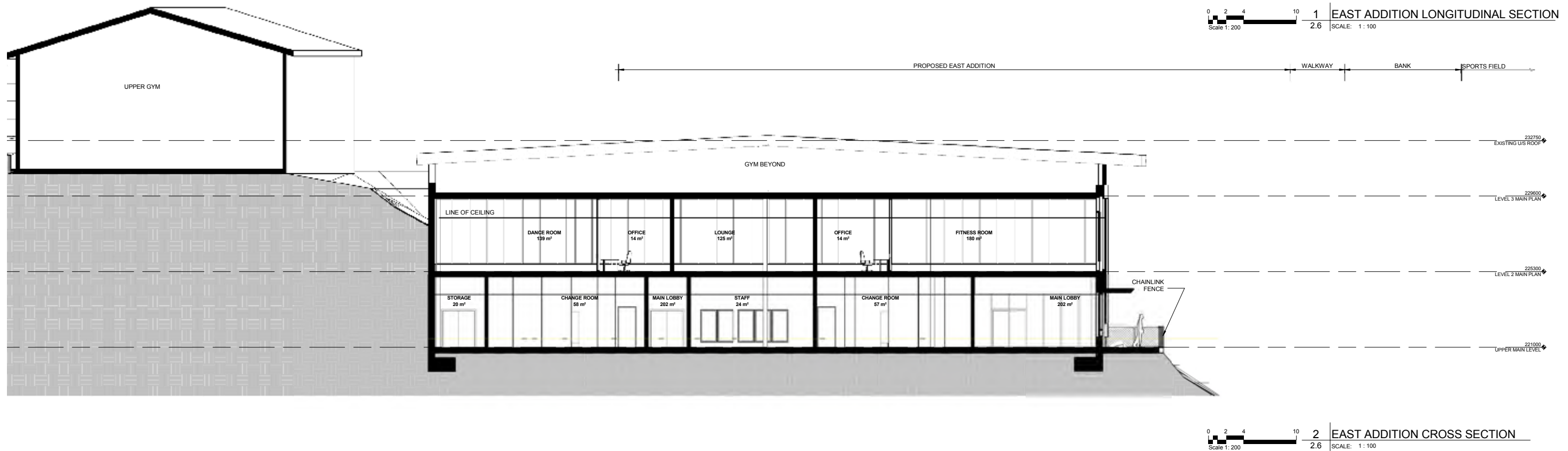
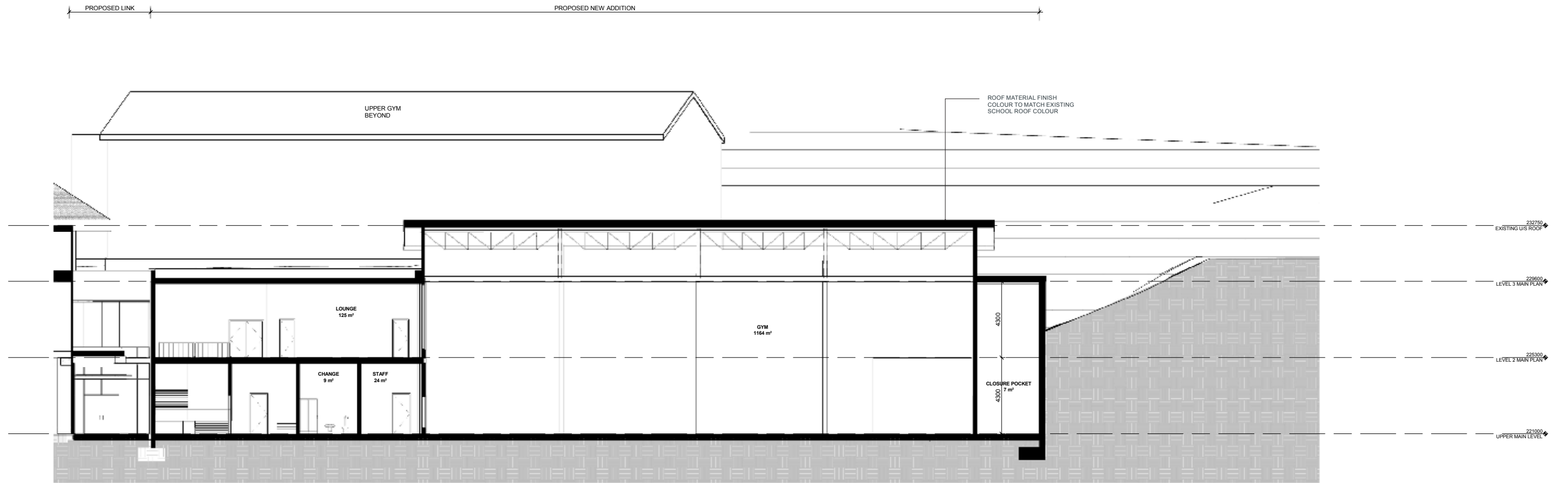


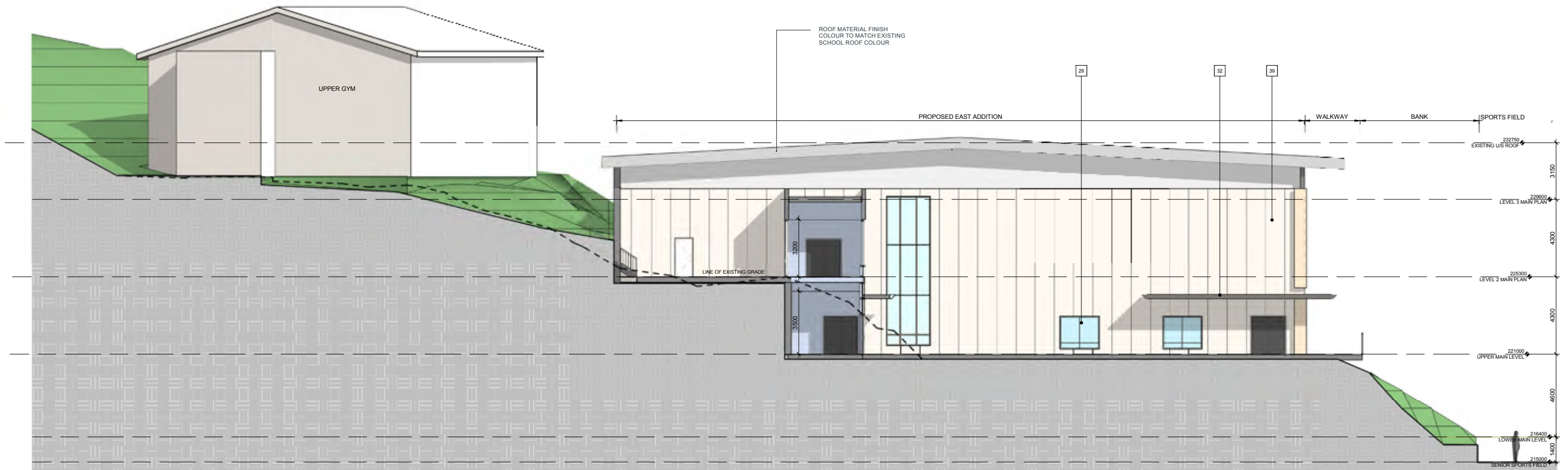




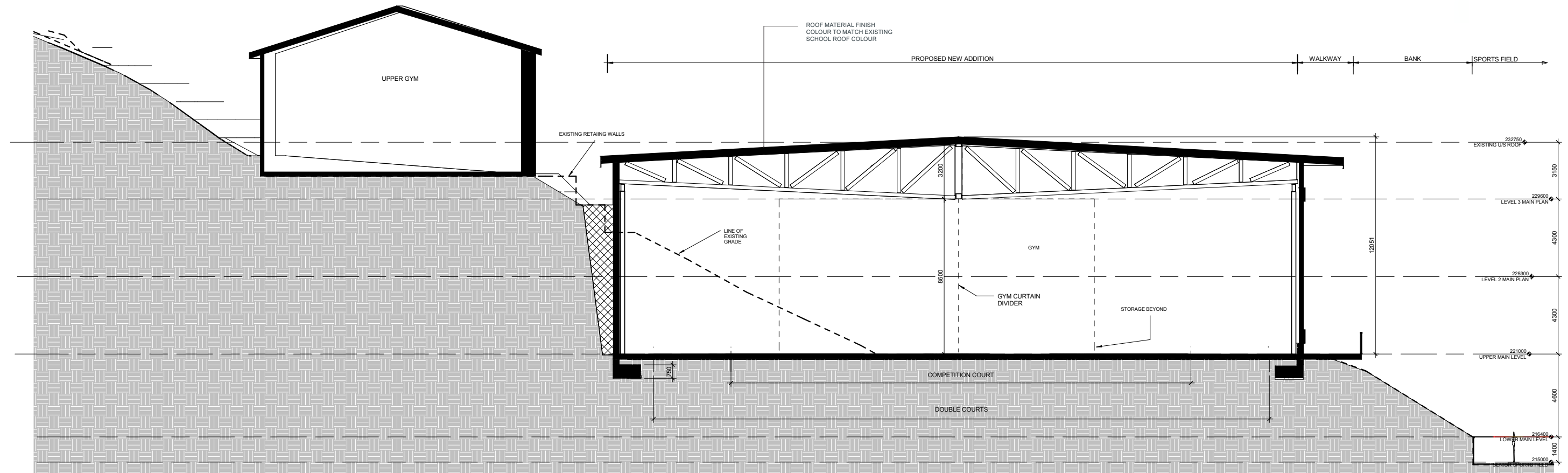
1 Looking East 2-East Addition-DD
 A5.04 SCALE: 1:100



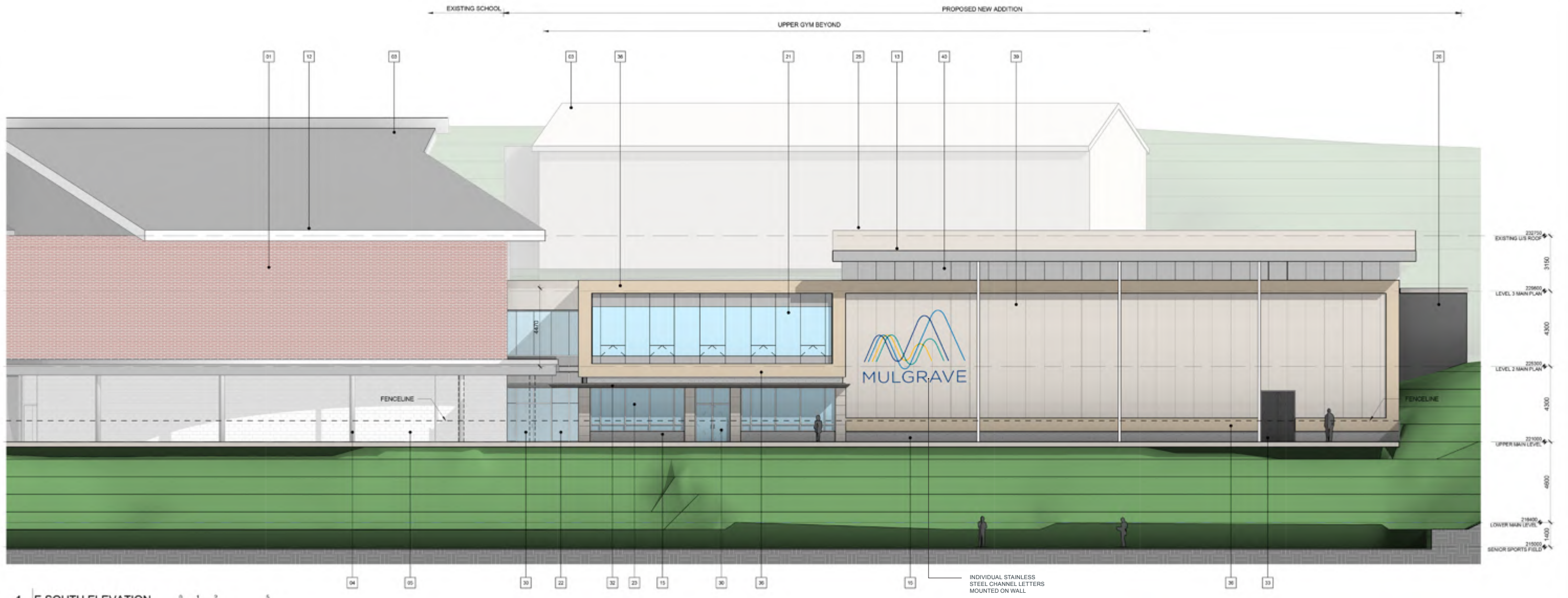




1 EAST ADDITION WEST ELEVATION
2.7.1 SCALE: 1:100



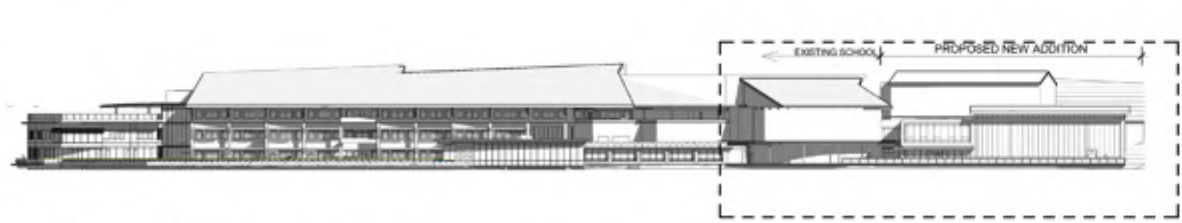
2 GRADE SECTION 2
2.7.1 SCALE: 1:100



1 E SOUTH ELEVATION
2.8 SCALE: 1:100



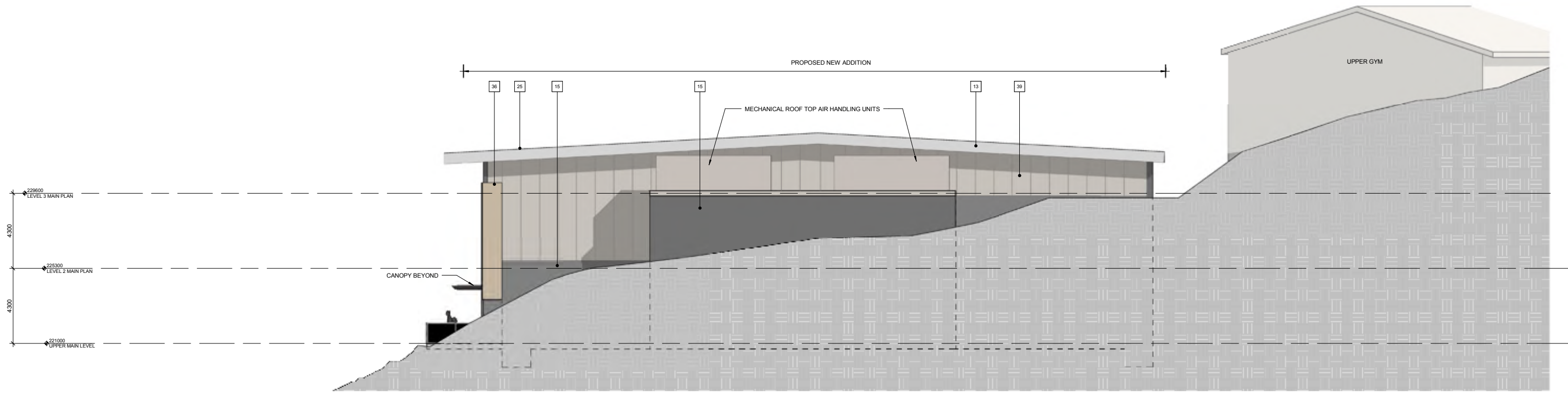
3 EXISTING WINDOW RELATIONSHIP
2.8 SCALE: 1:100



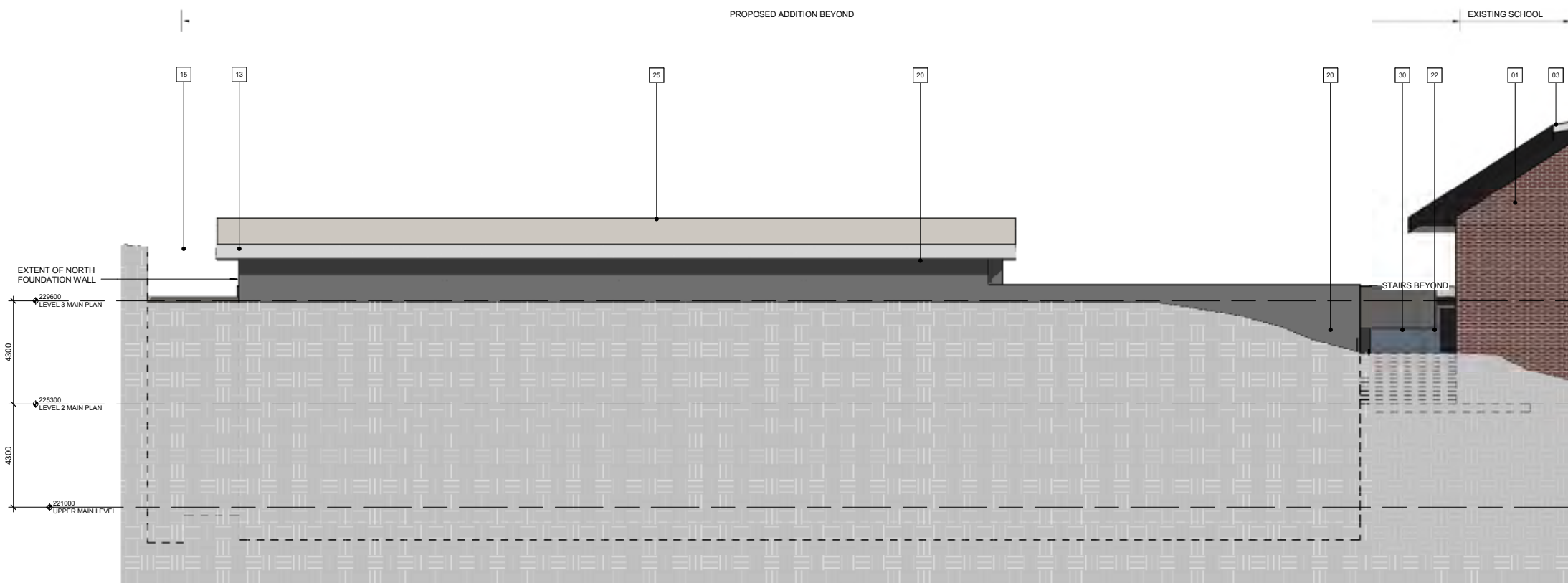
2 E SOUTH ELEVATION 2 KEYPLAN
2.8 SCALE: 1:700

MATERIALS LEGEND

01	EXISTING BRICK	11	EXISTING METAL LOUVER	21	SUNSHADE	31	CAPTURED CURTAIN WALL OPERABLE UNITS
02	EXISTING FIBER CEMENT PANELS	12	EXISTING PAINTED STEEL FASCIA	22	CURTAIN WALL GLAZING W/ VERTICAL CAPS	32	PAINTED CONCRETE CANOPY
03	EXISTING ROOF	13	PREFINISHED ALUMINUM FASCIA	23	4 SIDED CAPTURED CURTAIN WALL GLAZING	33	PAINTED METAL DOOR
04	EXISTING CONCRETE COLUMN	14	EXISTING GLAZED ENTRANCE DOOR	24	LOUVERED MECHANICAL SCREEN	34	GLAZED STOREFRONT BAY W/ COLOURED ACCENT PANELS
05	EXISTING CONCRETE MASONRY UNITS	15	EXPOSED ARCHITECTURAL CONCRETE	25	2 PLY SBS MEMBRANE ROOFING - COLOUR LIGHT GREY	35	CONCRETE BEAM
06	EXISTING ALUMINUM FRAMED WINDOWS	16	EXISTING BOX WINDOW CW/ HORIZONTAL SUNSHADES	26	GLAZED GUARDRAIL IN ALUMINUM FRAME	36	ALUMINUM PANELS
07	EXISTING STONE CLADDING	17	EXISTING METAL PANEL	27	METAL ACCENT PANELS	37	CONCRETE RETAINING WALL
08	EXISTING CURTAINWALL GLAZING	18	EXISTING GLAZED GUARDRAIL	28	METAL CLADDING	38	EXPOSED CONCRETE COLUMN
09	EXISTING HORIZONTAL SUNSHADE	19	STONE CLADDING	29	PUNCHED ALUMINUM FRAME WINDOWS	39	INSULATED SANDWICH PANEL SANDCOLOR FINISH
10	EXISTING PREFINISHED ALUMINUM FASCIA	20	PAINTED CAST IN PLACE CONCRETE	30	GLAZED ENTRANCE DOOR W/ ALUMINUM FRAME	40	INSULATED SANDWICH PANEL SILVER FINISH



1 | E EAST ELEVATION
2.10 | SCALE: 1:100



2 | E NORTH ELEVATION
2.10 | SCALE: 1:100



MATERIALS LEGEND

01	EXISTING BRICK	21	SUNSHADE
02	EXISTING FIBER CEMENT PANELS	22	CURTAIN WALL GLAZING W/ VERTICAL CAPS
03	EXISTING ROOF	23	4 SIDED CAPTURED CURTAIN WALL GLAZING
04	EXISTING CONCRETE COLUMN	24	LOUVRED MECHANICAL SCREEN
05	EXISTING CONCRETE MASONRY UNITS	25	2 PLY SBS MEMBRANE ROOFING - COLOUR LIGHT GREY
06	EXISTING ALUMINUM FRAMED WINDOWS	26	GLAZED GUARDRAIL IN ALUMINUM FRAME
07	EXISTING STONE CLADDING	27	PAINTED ACCENT PANELS
08	EXISTING CURTAINWALL GLAZING	28	METAL CLADDING
09	EXISTING HORIZONTAL SUNSHADE	29	PUNCHED ALUMINUM FRAME WINDOWS
10	EXISTING PREFINISHED ALUMINUM FASCIA	30	GLAZED ENTRANCE DOOR W/ ALUMINUM FRAME
11	EXISTING METAL LOUVRE	31	CAPTURED CURTAIN WALL OPERABLE UNITS
12	EXISTING PAINTED STEEL FASCIA	32	PAINTED CONCRETE CANOPY
13	PREFINISHED ALUMINUM FASCIA	33	PAINTED METAL DOOR
14	EXISTING GLAZED ENTRANCE DOOR	34	GLAZED STOREFRONT BAY W/ COLOURED ACCENT PANELS
15	EXPOSED ARCHITECTURAL CONCRETE	35	CONCRETE BEAM
16	EXISTING BOX WINDOW C/W HORIZONTAL SUNSHADES	36	ALUMINUM PANELS
17	EXISTING METAL PANEL	37	CONCRETE RETAINING WALL
18	EXISTING GLAZED GUARDRAIL	38	EXPOSED CONCRETE COLUMN
19	STONE CLADDING	39	INSULATED SANDWICH PANEL SANDCOLOR FINISH
20	PAINTED CAST IN PLACE CONCRETE	40	INSULATED SANDWICH PANEL SILVER FINISH



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 LANDSCAPE
 ARCHITECTS
 Suite C100 - 4185 Still Creek Drive
 Burnaby, British Columbia, V5C 6G9
 p: 604 294-5011 ; f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
-----	------	----------------------	-----

CLIENT:

PROJECT:

MULGRAVE SCHOOL
 CYPRESS BOWL LANE
 WEST VANCOUVER

DRAWING TITLE:
LANDSCAPE PLAN

DATE: 15 NOV 18 DRAWING NUMBER:
 SCALE: 1:100 **LO**
 DRAWN: CW
 DESIGN: CW
 CHKD: PCM **OF 4**

PMG PROJECT NUMBER: 39 15-148



CONCEPT IMAGES



ADVENTURE PLAY - NATURAL PLAY ELEMENTS - LOGS AND BOULDERS



MUSIC WALL



SLOPING TRIKE PATH



WOODEN CLIMBING STRUCTURE



VERTICAL MAZE - COLOURED POLES



BAREFOOT PATH

TREE SCHEDULE				PMG PROJECT NUMBER: 15-148
KEY	QTY	BOTANICAL NAME	COMMON NAME	PLANTED SIZE / REMARKS
	4	ACER CIRCINATUM	VINE MAPLE	2.5M HT. B&B, 3 STEM CLUMP
	1	ACER RUBRUM 'KARPIK'	COLUMNAR KARPICK MAPLE	7CM CAL, 2M STD, B&B
	5	STREET TREE		

NOTES: * PLANT SIZES IN THIS LIST ARE SPECIFIED ACCORDING TO THE BC LANDSCAPE STANDARD, LATEST EDITION. CONTAINER SIZES SPECIFIED AS PER CNLA STANDARDS. BOTH PLANT SIZE AND CONTAINER SIZE ARE THE MINIMUM ACCEPTABLE SIZES. * REFER TO SPECIFICATIONS FOR DEFINED CONTAINER MEASUREMENTS AND OTHER PLANT MATERIAL REQUIREMENTS. * SEARCH AND REVIEW MAKE PLANT MATERIAL AVAILABLE FOR OPTIONAL REVIEW BY LANDSCAPE ARCHITECT AT SOURCE OF SUPPLY. AREA OF SEARCH TO INCLUDE LOWER MAINLAND AND FRASER VALLEY. * SUBSTITUTIONS: OBTAIN WRITTEN APPROVAL FROM THE LANDSCAPE ARCHITECT PRIOR TO MAKING ANY SUBSTITUTIONS TO THE SPECIFIED MATERIAL. UNAPPROVED SUBSTITUTIONS WILL BE REJECTED. ALLOW A MINIMUM OF FIVE DAYS PRIOR TO DELIVERY FOR REQUEST TO SUBSTITUTE. SUBSTITUTIONS ARE SUBJECT TO BC LANDSCAPE STANDARD - DEFINITION OF CONDITIONS OF AVAILABILITY. ALL LANDSCAPE MATERIAL AND WORKMANSHIP MUST MEET OR EXCEED BC LANDSCAPE STANDARD'S LATEST EDITION. ALL PLANT MATERIAL MUST BE PROVIDED FROM CERTIFIED DISEASE FREE NURSERY

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p: 604 294-0011 : f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
-----	------	----------------------	-----

CLIENT:

PROJECT:

MULGRAVE SCHOOL

CYPRESS BOWL LANE
WEST VANCOUVER

DRAWING TITLE:
LANDSCAPE PLAN - ELC

DATE:	15 NOV 18	DRAWING NUMBER:	
SCALE:	1:100		
DRAWN:	CW		
DESIGN:	CW		
CHKD:	PCM		

L1

OF 4



VERTICAL POLE MAZE FEATURE



AMPHITHEATRE / OUTDOOR CLASSROOM FEATURE

TREE SCHEDULE

QTY	BOTANICAL NAME	COMMON NAME	PLANTED SIZE / REMARKS
4	ARIES GRANDIS	GRAND FIR	1.5 M H.
3	FRAXINUS OXYCARPA RAYWOOD	RAYWOOD ASH	BCM CAL. 1.8M STD. 848

PMG PROJECT NUMBER: 15-148

NOTES: * PLANT SIZES IN THIS LIST ARE SPECIFIED ACCORDING TO THE BC LANDSCAPE STANDARD, LATEST EDITION. CONTAINER SIZES SPECIFIED AS PER OMA STANDARDS. BOTH PLANT SIZE AND CONTAINER SIZE ARE THE MINIMUM ACCEPTABLE SIZES. * REFER TO SPECIFICATIONS FOR DEFINED CONTAINER MEASUREMENTS AND OTHER PLANT MATERIAL REQUIREMENTS. * SEARCH AND REVIEW MAKE PLANT MATERIAL AVAILABLE FOR OPTIONAL REVIEW BY LANDSCAPE ARCHITECT AT SOURCE OF SUPPLY. AREA OF SEARCH TO INCLUDE LOWER MARLAND AND FRASER VALLEY. * SUBSTITUTIONS OBTAIN WRITTEN APPROVAL FROM THE LANDSCAPE ARCHITECT PRIOR TO MAKING ANY SUBSTITUTIONS TO THE SPECIFIED MATERIAL. UNAPPROVED SUBSTITUTIONS WILL BE REJECTED. ALLOW A MINIMUM OF FIVE DAYS PRIOR TO DELIVERY FOR REQUEST TO SUBSTITUTE. SUBSTITUTIONS ARE SUBJECT TO BC LANDSCAPE STANDARD - DEFINITION OF CONDITIONS OF AVAILABILITY. ALL LANDSCAPE MATERIAL AND WORKMANSHIP MUST MEET OR EXCEED BC LANDSCAPE STANDARD'S LATEST EDITION. ALL PLANT MATERIAL MUST BE PROVIDED FROM CERTIFIED DISEASE FREE NURSERY.

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SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.

CLIENT:

PROJECT:
MULGRAVE SCHOOL
CYPRESS BOWL LANE
WEST VANCOUVER

DRAWING TITLE:
LANDSCAPE PLAN - JUNIOR SCHOOL

DATE: 15 NOV. 18 DRAWING NUMBER:
SCALE: 1:100
DRAWN: CW
DESIGN: CW
CHKD: PCM

L2
OF 4



ADVENTURE PLAY - LOGS AND BOULDERS



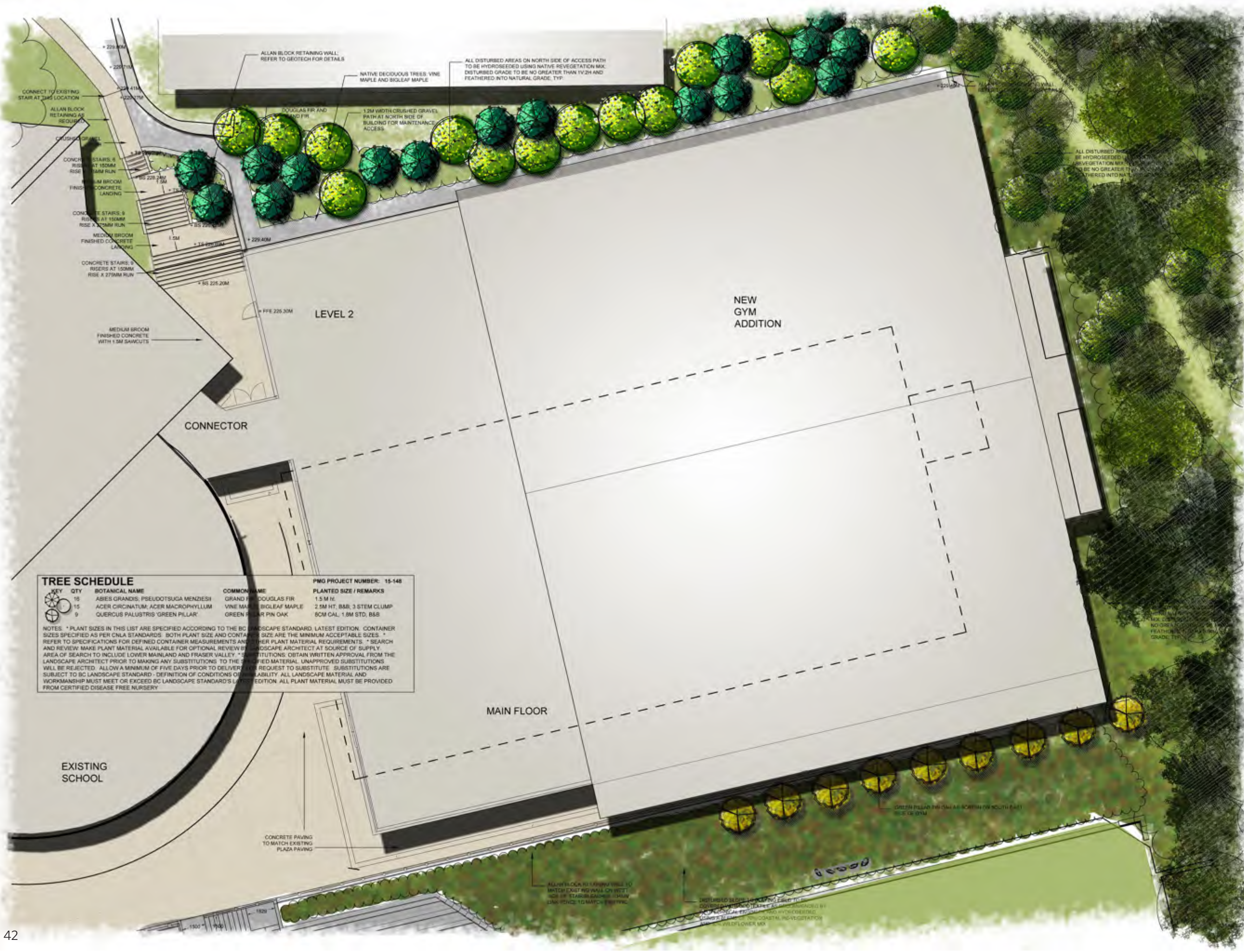
CORROCORD SPACENET



ARTIFICIAL TURF LAWN



WATER TABLE PLAY



TREE SCHEDULE

KEY	QTY	BOTANICAL NAME	COMMON NAME	PLANTED SIZE / REMARKS
	15	ABIES GRANDIS, PSEUDOTSUGA MENZIESII	GRAND FIR, DOUGLAS FIR	1.5 M H.
	15	ACER CIRCINATUM, ACER MACROPHYLLUM	VINE MAPLE, BIGLEAF MAPLE	2.5M HT, B&B; 3 STEM CLUMP
	9	QUERCUS PALUSTRIS 'GREEN PILLAR'	GREEN PILLAR PIN OAK	6CM CAL, 1.8M STD, B&B

NOTES: * PLANT SIZES IN THIS LIST ARE SPECIFIED ACCORDING TO THE BC LANDSCAPE STANDARD, LATEST EDITION. CONTAINER SIZES SPECIFIED AS PER CNLA STANDARDS. BOTH PLANT SIZE AND CONTAINER SIZE ARE THE MINIMUM ACCEPTABLE SIZES. * REFER TO SPECIFICATIONS FOR DEFINED CONTAINER MEASUREMENTS AND OTHER PLANT MATERIAL REQUIREMENTS. * SEARCH AND REVIEW MAKE PLANT MATERIAL AVAILABLE FOR OPTIONAL REVIEW BY LANDSCAPE ARCHITECT AT SOURCE OF SUPPLY. AREA OF SEARCH TO INCLUDE LOWER MAINLAND AND FRASER VALLEY. * SUBSTITUTIONS OBTAIN WRITTEN APPROVAL FROM THE LANDSCAPE ARCHITECT PRIOR TO MAKING ANY SUBSTITUTIONS TO THE SPECIFIED MATERIAL. UNAPPROVED SUBSTITUTIONS WILL BE REJECTED. ALLOW A MINIMUM OF FIVE DAYS PRIOR TO DELIVERY FOR REQUEST TO SUBSTITUTE. SUBSTITUTIONS ARE SUBJECT TO BC LANDSCAPE STANDARD - DEFINITION OF CONDITIONS OF LIABILITY. ALL LANDSCAPE MATERIAL AND WORKMANSHIP MUST MEET OR EXCEED BC LANDSCAPE STANDARD'S LATEST EDITION. ALL PLANT MATERIAL MUST BE PROVIDED FROM CERTIFIED DISEASE FREE NURSERY.

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SEAL:

NO. DATE REVISION DESCRIPTION DR.

CLIENT:

PROJECT:
MULGRAVE SCHOOL
CYPRESS BOWL LANE
WEST VANCOUVER

DRAWING TITLE:
LANDSCAPE PLAN - EAST END GYM

DATE: 15 NOV 18 DRAWING NUMBER:
SCALE: 1:100
DRAWN: CW
DESIGN: CW
CHKD: PCM
PMG PROJECT NUMBER: 15-148

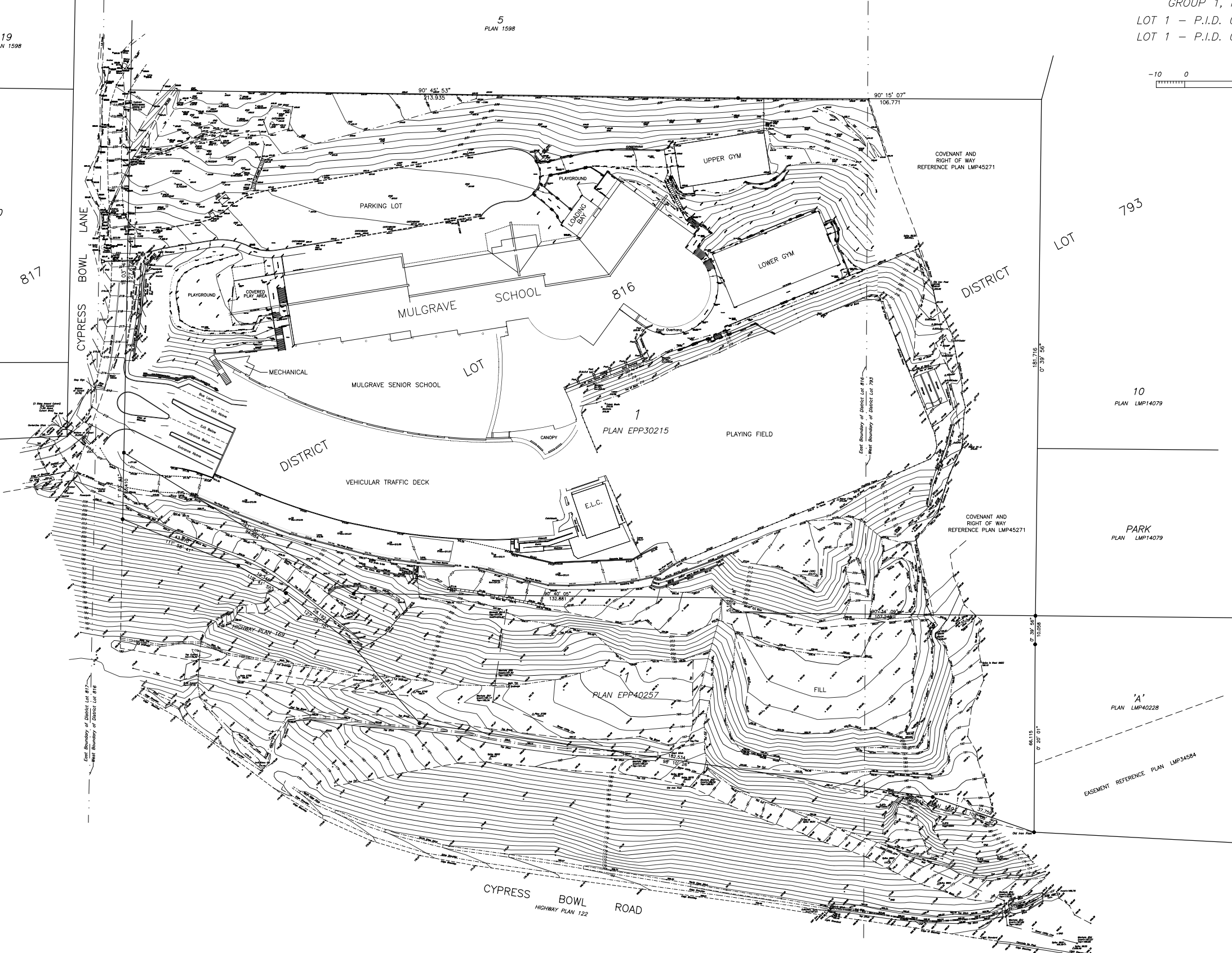
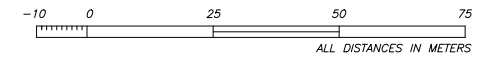
L3

OF 4

COMPOSITE PLAN OF PART OF
 LOT 1 OF PLAN EPP30215 AND
 LOT 1 OF PLAN EPP40257
 BOTH OF DISTRICT LOTS 793 AND 816

GROUP 1, NEW WESTMINSTER DISTRICT
 LOT 1 - P.I.D. 029-077-842 (PLAN EPP30215)
 LOT 1 - P.I.D. 029-308-461 (PLAN EPP40257)

SCALE = 1:750



Notes:
 Lot 1-Plan EPP30215
 This title may be affected by permits under part 26 of the Local Government Act, see BR3007581 and BR793514, and by part 26 of the Municipal Act, see BP104051.
 This lot is subject to:
 -Two (2) Statutory Rights of Way, (BL116382) in favour of B.C. Hydro, and (BL116383) in favour of B.C. Tel.
 -Two (2) Covenants BP56201, BP65981, both in favour of the Corporation of the District of West Vancouver.
 -Restrictive Covenant (BN303747).

Lot 1-Plan EPP40257
 This lot is subject to:
 -Two (2) Under Surface and Other EXO and REC, see (CA3550438) and (BB4064659), both in favour of the Crown in Right of B.C., Inter Alia.
 -Covenant (CA3645126), in favour of the Crown in Right of B.C.
 -Restrictive Covenant (BB1951118).

Elevations are to Geodetic Datum and are derived from the Chairlift Topography Project.

This Document is not valid unless originally signed & sealed.

Certified Correct according to Plans EPP30215 and EPP40257.

September 29, 2015.

© CHAPMAN LAND SURVEYING LTD., 2015
 British Columbia Land Surveyors
 #07-100 Park Royal South
 WEST VANCOUVER, B.C.
 V7T 1A2 604-926-7311
 FAX 604-926-6923
 EMAIL sandy@chaplansurvey.com

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Slope Stability Review



DAVIES GEOTECHNICAL INC.

MULGRAVE SCHOOL

**SLOPE STABILITY REVIEW
EVALUATION OF SETBACKS FOR FUTURE
DEVELOPMENT**

PROJECT No: 1092
DATE: Feb 15, 2012

Page 2

Geotechnical Report
Mulgrave School – West Vancouver

Feb 15, 2012

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ATTACHMENTS

Figure 1: Site Plan

Figure 2: Cross Sections A-C

Figure 3: Cross Sections D-E

Davies Geotechnical Inc.

#2 –1520 Cliveden Ave, Delta, B.C.

1.0 INTRODUCTION

In response to your request, Davies Geotechnical Inc. has completed a landslide assessment for the slopes located on the east side of the existing Mulgrave School property located in West Vancouver, B.C. The objective of this work was to provide a plan showing the safe limits for future development or re-development of the property.

This work was carried out in compliance with the task force report titled “Guidelines for Legislated Landslide Assessments for Proposed Residential Developments in BC”, published by APEGBC in May 2010 .

2.0 SITE DESCRIPTION

The Mulgrave School property is located north of Highway # 1 in West Vancouver and is accessed from the Cypress Bowl exit. The property is bounded to the west by Rodgers Creek – Trib N, and the east by Rodgers Creek.

Grades within the property slope down from north to south. A series of near horizontal benches exist within this sloping property that form platforms for the existing school building, auxiliary buildings, play fields and parking areas. A number of modular block retaining walls were observed within the property.

3.0 SUBSURFACE CONDITIONS

3.1 Site Geology

Review of Geologic Survey of Canada Map 1486 A indicates that the site is located within an area underlain at relatively shallow depth by very dense glacially deposited soils and bedrock. Our experience with numerous projects in close proximity to the school site indicated that the thickness of overburden soils overlying these dense glacially deposited soils ranges within 1 meter to 2 meters, with occasional increases in thickness to 3 meters at low lying depressions or in-filled channels.

The overburden soils generally consist of a mixture of silt and sand with little to some gravel. These soils are generally in a loose to medium dense state.

The underlying glacially deposited soils, while somewhat variable in nature, generally consisting of a well graded mixture of silt, sand, and clay with some gravel and boulders. These soils are very dense and relatively impermeable.

3.2 Observed Soil Conditions

Davies Geotechnical Inc. completed a traverse through the Rodgers Creek gully area on February 8, 2012. During this reconnaissance, we observed and noted the soil profile and soil conditions at locations where they had been exposed. In general, the depth to the very dense till-like soils was 1 meter or less at these soil exposures.

3.3 Groundwater

Groundwater levels typically fluctuate seasonally. During the summer months when there is little or no precipitation, water levels within the soils can be very deep. During the winter months and after long periods of sustained precipitation, a perched water layer develops at the top of the low permeability till-like soil. Typically, during this time the till-like soils are found to be fully saturated.

4.0 SLOPE STABILITY ANALYSES – EXISTING SLOPES

4.1 Methodology

The assessment of the risk of slope failure can be expressed as a factor of safety against slope failure. This factor of safety is represented by the ratio of the force or moment resisting slope failure divided by the force or moment driving slope failure. It is generally accepted by the engineering community that a factor of safety in excess of 1.5 represents a condition of very low risk of slope failure.

Davies Geotechnical Inc. completed analysis of the existing slopes on the east side of the property utilizing limit equilibrium methods of analysis to assess the factor of safety of these slopes. The Morgenstern and Price procedures were adopted as they are considered a rigorous method of analysis and consider force equilibrium and moment equilibrium.

4.2 Input Parameters

4.2.1 Slope Geometry

The geometry of the slopes adjacent to Mulgrave School was modelled using the topographic information provided by Webster Engineering. This information included a site plan with topographic contours, as well as, five cross sections through the east side of the Mulgrave School property and the west bank of the Rodgers Creek gully. The site plan attached to this report illustrates the orientation and location of the cross sections considered in this study. Figures 2 and 3 provide the geometry of the five cross sections considered in our stability analyses.

Due to the limited access to the study area, a site specific investigation of soil conditions was not practical. Therefore, assumptions were made by Davies Geotechnical Inc. with respect to the thickness of individual soil layers, based upon previous experience in the area.

4.2.2 Soil Parameters

The input parameters relating to the soil properties, such as unit weight and shear strength, were estimated based upon visual classification, reported text book values, and experience. These parameters are listed in Table 1.

Table 1: Soil Parameters Used for Stability Analysis

Soil or Rock	Unit Weight (kN/ m ³)	Friction Angle (degrees)	Cohesion (kPa)
Overburden	18	33	5
Till-Like	21.5	39	50

4.2.3 Water Levels

Groundwater levels are expected to fluctuate seasonally and with precipitation. We anticipate based upon our experience in the area that the worst case condition with respect to water levels and their impact upon slope stability will be the “winter” condition where a perched water table develops at the top of the relatively impermeable till-like soils.

4.2.4 Surcharge Loads

The stability analysis carried out by Davies Geotechnical Inc. did not consider the impact of surcharge loading near the slope crest.

5.0 ACCEPTANCE CRITERIA REGARDING SLOPE HAZARDS

To our knowledge, the District of West Vancouver has not officially adopted specific criteria for the safety of soil slopes. Davies Geotechnical Inc. has completed numerous landslide assessments and has adopted safety criteria that were recently adopted by The District of North Vancouver. These criteria are summarized in Table 2.

Table 2: Acceptance Criteria

Development Type	Static	Seismic
Existing Development	greater than 1.3	greater than 1.0 or slope displacement less than 0.15m
New or Proposed Development	greater than 1.5	greater than 1.0 or slope displacement less than 0.15m

6.0 SLOPE STABILITY ANALYSIS RESULTS

The slope stability analysis was carried out for Sections 1 to 5 utilizing the input parameters summarized within the previous sections of this report. The purpose of this analysis was to determine, at each cross section, the location beyond which the factor of safety exceeded the acceptance criteria. This location is termed the “geotechnical setback” and is illustrated on Figure 1 attached to this report. The location of this safe setback line was found to vary in location depending upon the depth and steepness of the Rodgers Creek ravine.

The results of the analysis also indicated factors of safety lower than the acceptance criteria exist for shallow slip surfaces parallel with the ravine slopes. In view of the steepness of portions of the ravine and the potential for erosion and down cutting at the toe of the slope, it is likely that small shallow slope failures will occur on these existing slopes.

7.0 RECOMMENDATIONS REGARDING FUTURE DEVELOPMENT

In order to satisfy the requirements of the provincial legislation with respect to landslide safety, it is recommended that all future development on the Mulgrave School property remain on the west side of the geotechnical setback line.

Grades between the top of bank and the geotechnical setback line should remain unchanged.

The geotechnical set back line provided within this study did not consider the impact of surcharge loading. Therefore in the event that an increase in the grades within closed proximity to this setback is considered or in the event that it is proposed to construct a building or structure, a site-specific review of slope stability and foundation design should be completed by the geotechnical engineer. Structures or grade increases located beyond a line extending at 2.5 horizontal to 1 vertical from the base of the Rodgers Creek ravine to the current grade level will likely not require a site-specific assessment in terms of impact upon the stability of the Rodgers Creek ravine.

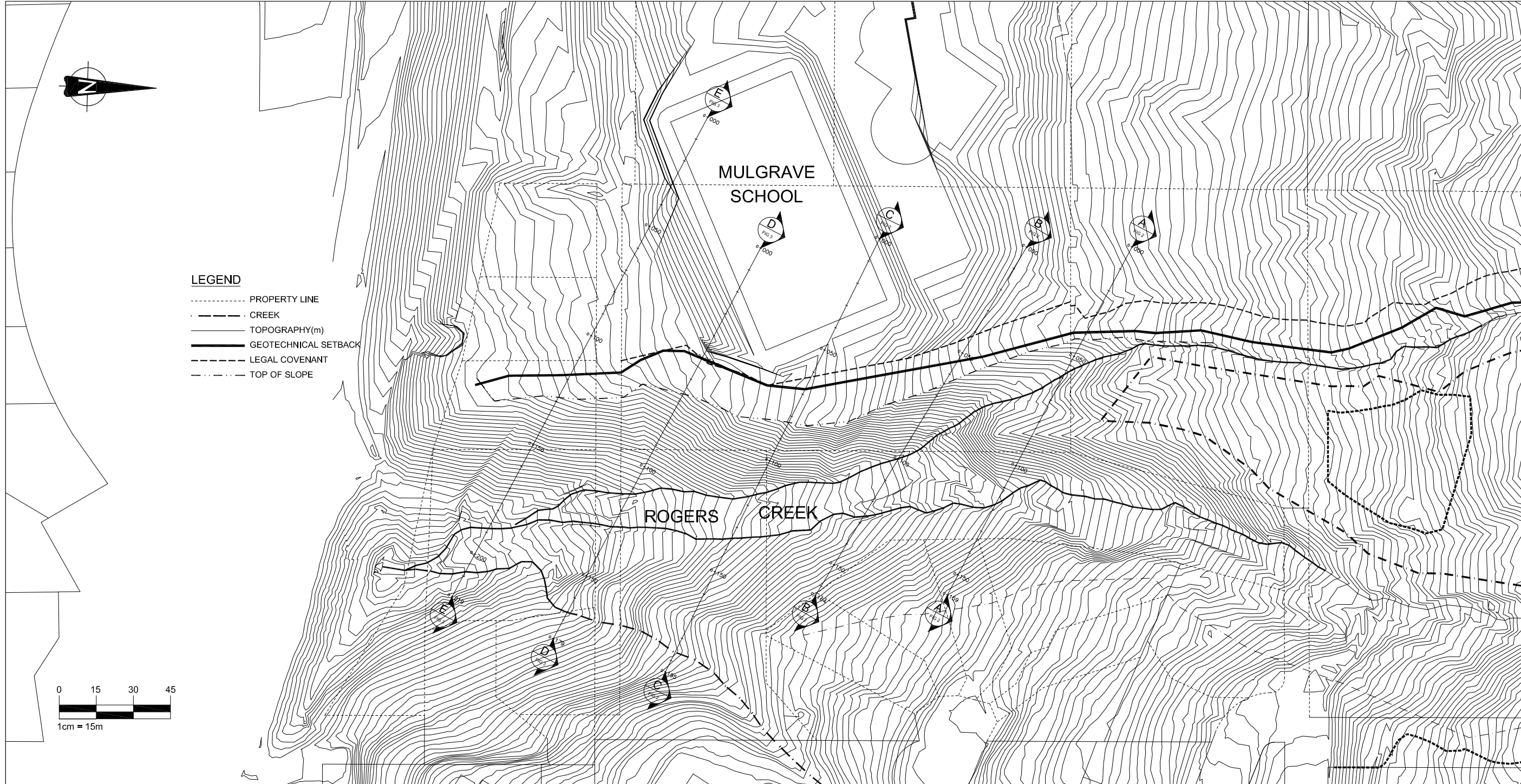
Site drainage and stormwater systems should be designed to minimize surface water flow towards the Rodgers Creek ravine.

8.0 CLOSURE

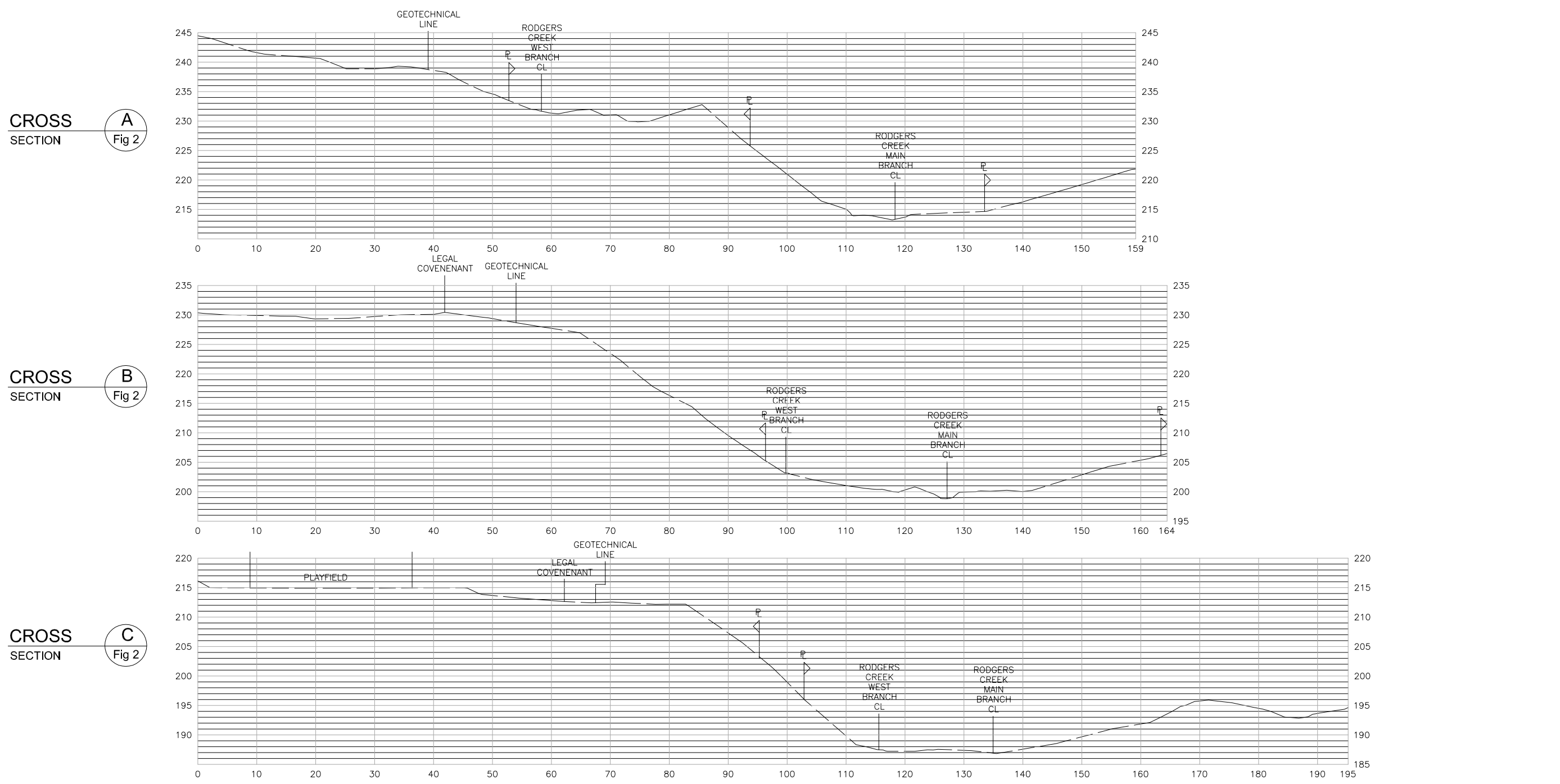
We trust that the information presented within this report meets your requirements. If you have any questions please do not hesitate to contact the undersigned at 604-395-2300.

Yours truly,

DAVIES GEOTECHNICAL INC.
Paul A. Davies, P. Eng.



E			 <p>Davies Geotechnical Inc. #2 - 1520 Cliveden Avenue, Delta, B.C. V3M 6J8 Tel 604-395-2300 Fax, 604-395-2301</p> <p><i>Client</i> MULGRAVE SCHOOL</p>	DWN BY: KL	PROJECT	PROPOSED DEVELOPMENT WEST VANCOUVER, BC	DATE: February 2012
D				CHK'D BY: PD			PROJECT NO: 1092
C				APP. PD	TITLE	SITE PLAN	REV. NO.: A
B				SCALE			FIGURE No. FIGURE 1
A				1:1500			
REV.	DATE	REVISION					



E		
D		
C		
B		
A		
REV.	DATE	REVISION



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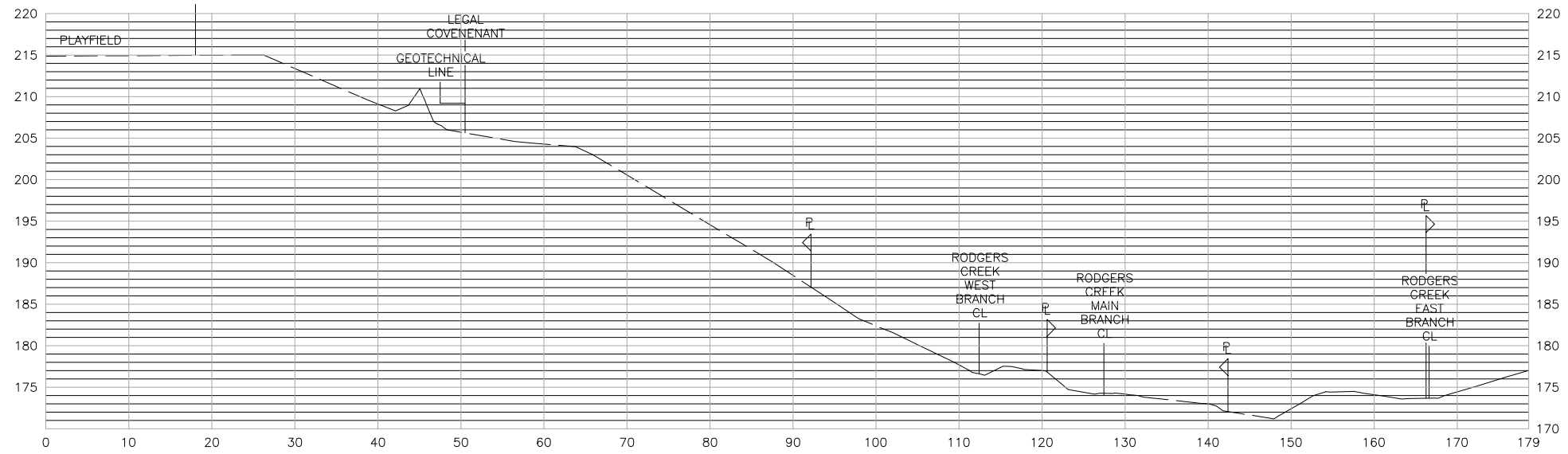
Client
MULGRAVE SCHOOL

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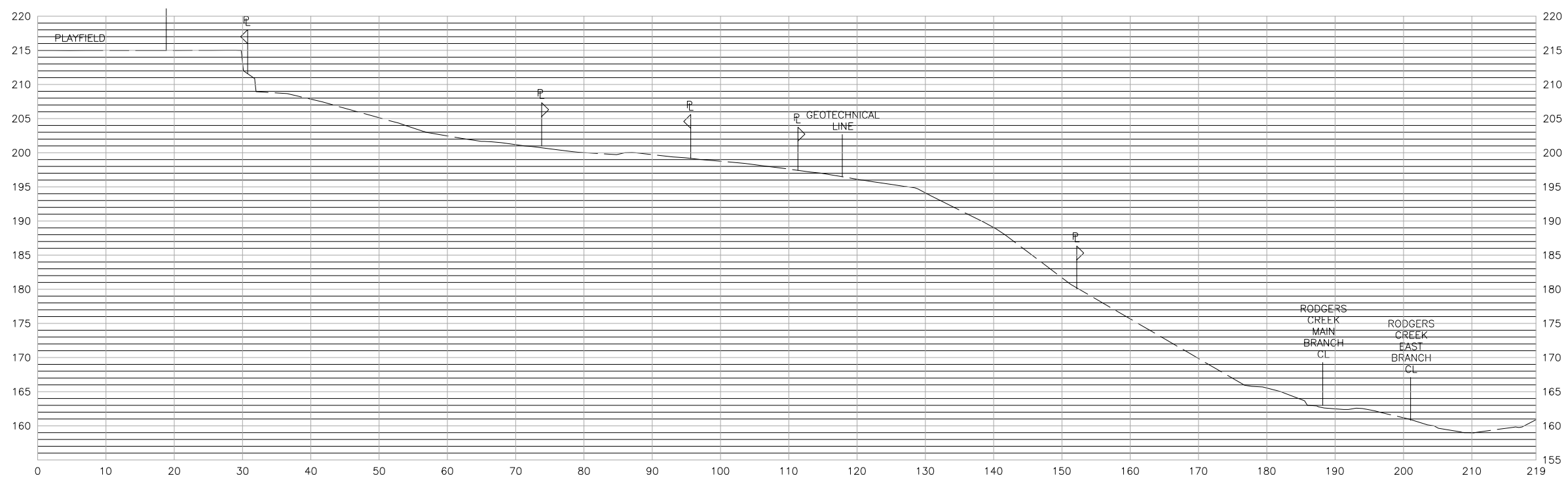
PROJECT	PROPOSED DEVELOPMENT WEST VANCOUVER, BC
TITLE	SECTIONS A-C

DATE:	February 2012
PROJECT NO.:	1092
REV. NO.:	A
FIGURE No.	FIGURE 2

CROSS SECTION **D**
Fig 3



CROSS SECTION **E**
Fig 3



E		
D		
C		
B		
A		
REV.	DATE	REVISION



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MULGRAVE SCHOOL

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SCALE	AS SHOWN

PROJECT	PROPOSED DEVELOPMENT WEST VANCOUVER, BC
TITLE	SECTIONS D-E

DATE:	February 2012
PROJECT NO.:	1092
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FIGURE No.	FIGURE 3

