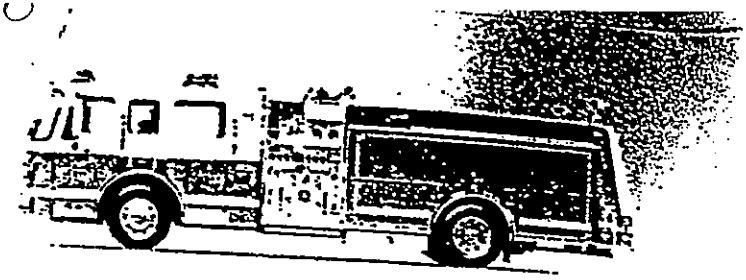
Happy Valley Elementary School
5291 Happy Valley Road
Langford, BC
Incident #NLG 04/10/14/10/01



FIRE/CAUSE DETERMINATION REPORT

Submitted by Ray Aitken, Fire Investigator
Office of the Fire Commissioner
Northern Regional Office (Prince George)
November, 2004

FIRE CAUSE / DETERMINATION REPORT
PREPARED BY RAY AITKEN
FIRE INVESTIGATOR
OFFICE OF THE FIRE COMISSIONER
NORTHERN REGION (PRINCE GEORGE)

Monday January17, 2005

RE:
INCIDIENT # - NLG 04 10 14 10 01
HAPPY VALLEY ELEMENTARY SCHOOL
3291 HAPPY VALLEY ROAD
LANGFORD, BC

INTRODUCTION

At the request of Deputy Fire Commissioner Robert TURLEY, Office of the Fire Commissioner, Headquarters (Victoria) and Assistant Fire Chief (Prevention) Kerry ZADO of the City of Langford Fire Rescue Service, the undersigned conducted a fire investigation at the premises of HAPPY VALLEY ELEMENTARY SCHOOL, School District #62 (Sooke), 3291 Happy Valley Road, Langford, BC from Monday, 2004/10/18 thru Friday, 2004/10/22 to determine the cause of a structure fire that completely destroyed an elementary school (kindergarten to grade 6). (See drawings S/1, S2, T/1, F/1, A/1 and A/2 and photographs 1-14).

ELEMENTARY SCHOOL FIRE DISCOVERED / REPORTED BY

- **FIRE DISCOVERED BY:**

The first indication of a fire at the HAPPY VALLEY ELEMENTARY SCHOOL was at approximately 10:23 hours Thursday, 2004/10/14 when the schools monitored fire alarm system (alarm bells) activated alerting the staff and students of a problem. It was learned by the undersigned that the first observation of a "confirmed or real fire" in the school structure proper was when teacher [redacted] vacated her Classroom and students upon the activation of the schools fire alarm system (alarm bells ringing) and exited through the set of double leaf exit doors located at the end of Corridor 2027 (across from Classroom 2018) and leading to the exterior "BRAVO" sector of the school. (See drawings A/3, A/7 and F/1 and photographs 1,2,17-22).

indicated that upon reaching the exterior of the school structure on the BRAVO side she observed the exterior exit door to Multi-Purpose Room 2010 to be in the "open" position and upon further investigation she looked through the "open" exterior exit door into the interior of Multi-Purpose Room 2010 and observed the top surface of a desk and bulletin board on fire Also, she indicated that she observed the black construction paper placed on the inside glass surfaces of the 2 window units along the exterior wall of the Multi-Purpose Room 2010 were on fire. indicated that she immediately "shut" the exterior exit door to Multi-Purpose Room 2010 and then proceeded back to the location of her students (steps outside exit doors) and then proceeded with her students to the front of the school (playground area) where she

met up with the remaining students of her classroom. See drawings S/1, S/2 and A/1-A/5 and photographs 20,22,24-26).

- **FIRE REPORTED BY:**

The structure fire at the HAPPY VALLEY ELEMENTARY SCHOOL, 3291 Happy Valley Road, Langford, BC was initially reported by PRICE ALARMS, 800 block Fort Street, Victoria, BC (the 24 hour fire alarm monitoring company) upon receiving the activation of a trouble alarm coming from the schools monitored fire alarm system at 10:27 hours Thursday, 2004/10/14. The PRICE ALARMS representatives immediately contacted the local EMERGENCY 911 Regional Fire Dispatch Center (Langford) at 10:28 hours Thursday, 2004/10/14 advising them that they had received a trouble alarm from the monitored fire alarm system at the HAPPY VALLEY ELEMENARY SCHOOL, 3291 Happy Valley Road, Langford, BC.

- **ADDITIONAL FIRE CALLS - HAPPY VALLEY ELEMENTARY SCHOOL**

It should be noted the EMERGENCY 911 Regional Fire Dispatch Center (Langford) received additional fire calls and one in particular at 10:30 hours, Thursday 2004/10/14 from a staff member [ ] at the HAPPY VALLEY ELEMENTARY SCHOOL. The caller indicated that there was a "confirmed or real structural fire" at the school with smoke and flames being observed protruding through the roof of the school structure.

EMERGENCY RESPONSE TO THE FIRE SCENE

- **CITY OF LANGFORD FIRE RESCUE SERVICE RESPONSE**

The EMERGENCY 911 Regional Fire Dispatch Center (Langford) received the initial fire call at 10:28 hours Thursday 2004/10/14 dispatching the City of Langford Fire Rescue Service career / auxiliary (volunteer) firefighters from Fire Hall #1 to the fire scene. This was immediately followed at 10:30 hours by further dispatching the auxiliary (auxiliary) firefighters from the City of Langford Fire Rescue Service, Hall #2 to the fire scene. (See drawing F/1).

- **MUTUAL AID RESPONSE – SURROUNDING MUNICIPAL FIRE SERVICES**

It should be noted that due to the fire conditions present upon arrival at the fire scene, the type of occupancy (A/2 elementary school), the construction (combination non combustible / combustible in different phases), size (2 levels) and age (1950's original with a number of additions) of the school structure the City of Langford Fire Rescue Service immediately requested mutual aid response from a number of surrounding municipal fire services. The EMERGENCY 911 Regional Fire Dispatch Center (Langford) initially dispatched the Colwood Fire Rescue Service at 10:33 hours, followed by the Highlands and Metchosin Fire Rescue Services at 10:41 hours and finally the Sooke Fire Rescue Service at 10:44 hours to respond to the fire scene. Further, the View Royal Fire Rescue Service was dispatched at 10:49 hours and requested to stand by at the City of Langford Fire Hall #1 to provide fire protection within the municipal boundaries of the City of Langford for its citizens.

Also, it was learned by the undersigned that the Esquimalt Fire Rescue Service was requested at 12:43 hours to respond to the fire scene with their "elevated platform aerial truck" and upon arrival at the fire scene it was positioned on the playground at the front of the school (ALPHA sector) in order to provide an elevated water stream into areas that were difficult or impossible to penetrate by firefighters with charged hose lines or portable monitors.

- **OTHER AGENCIES ATTENDING THE FIRE SCENE**

It was learned by the undersigned that at 10:35 hours, Thursday 2004/10/14 the on-scene Fire Incident Commander, Lieutenant Ryan YOUNG of the City of Langford Fire Rescue Service requested the local EMERGENCY 911 Regional Fire Dispatch Center (Langford) contact the West Shore RCMPolice (to provide traffic / crowd control), British Columbia Ambulance Service (to provide medical assistance services), BC Hydro (to de-energize the electrical energy supply service to the school structure) and Terasen Gas (to shut-off the natural gas supply service to the school structure) and have them attend the fire scene.

It was learned by the undersigned that at 10:41 hours, Thursday 2004/10/14 the local Transit Authority, the Emergency Social Service (ESS) and EOC were all requested by the Fire Incident Commander, Lieutenant Ryan YOUNG to attend the fire scene. Also, it was learned that Terasen Gas arrived on scene and shut-off the natural gas supply to the school at 11:25 hours. Further, BC Hydro arrived at the scene and de-energized the electrical energy supply service to the school structure minutes later.

- **FIRE SUPPRESSION OPERATIONS**

It was learned by the undersigned that upon arrival of the City of Langford Fire Rescue Service first fire apparatus / firefighters (708) at the fire scene (10:34 hours) they observed fire (orange / yellowish flames) with heavy smoke (grayish / black) prevalent on the "BRAVO" side of the school and coming from the roof overhang / windows / door openings of what was learned to be Multi-Purpose Room 2010. The firefighters immediately initiate an INDIRECT MODE OF ATTACK (DEFENSIVE) on the " BRAVO" sector of the school structure using a charged 1.75" (inch) hose line to attack and suppress the fire inside the fully involved Multi-Purpose Room 2010. (See drawing A/5, A/10 and photographs 1,2,17-19 and 22-25).

Upon the arrival of additional firefighters / fire apparatus on scene, a second DIRECT MODE OF ATTACK (OFFENSIVE) was initiated by ATTACK TEAM #1 using a charged 1.75" hose line and traveling through the front "ALPHA" sector main entry doors (lower floor) of the school. They entered up the center "open stairwell" to the second floor at Corridor 2027 where they proceeded to turn right and travel down Corridor 2027 to the intersection with Corridor 2028. They proceeded to enter into Corridor 2028 through a set of "closed" double leaf corridor exit doors (on automatic hold open devices tied to the fire alarm system) a distance inward of approximately 3'-0"- 4'-0"(feet) where an attempt was made to "penetrate" the ceiling membrane (combination drywall / fire rated board construction) and attack the fire in the ceiling cavity from this location. This initially proved to be very difficult task but was eventually achieved. At this location the "attack crew" with the use of a thermal imaging camera were able to observe the direction the thermal radiant heat waves of the fire where traveling within the open ceiling cavity above

Corridor 2028. They indicated that the thermal radiant heat waves were traveling in a diagonal direction (BRAVO to ALPHA sectors) within the open ceiling cavity. (See drawings A/5, A/7 and photographs 6 and 7).

It was learned by the undersigned that a second team ATTACK TEAM #2 initiated an INDIRECT MODE OF ATTACK (DEFENSIVE) on the rear CHARLIE sector of the school structure with the use of a charged 2.5" (inch) hose line They also laddered the structure at the rear CHARLIE sector in an attempt to access the roof and provide a "trench cut" to cut off the fire but were unsuccessful due to the volume / speed of the fire within the roof cavity and were forced to retreat and exited the roof on the rear CHARLIE sector. (See drawing A/5 and photographs 3-5).

Also, the rear ROOF sector crews initiated a DIRECT MODE OF ATTACK (OFFENSIVE) into the interior of the school on the rear CHARLIE sector of the structure through a set of exterior double leaf exit doors leading into Corridor 2027. Indications were this attack crew was able to travel up Corridor 2027 (towards the front of the school) to a location in the vicinity of the interior door leading through a small access corridor into Classroom 2007 (Computer Room) and just short of the corridor door leading into Library 2011. Due to restriction in the length of their charged hose they were forced to retreat back down Corridor 2027 because of the progressing fire conditions and eventually vacated the structure through the same exterior doors they had entered earlier at the end of Corridor 2027 on the rear CHARLIE sector of the structure. (See drawings A/2, A/5 and photographs 4, 5 and 51).

Further, ATTACKED TEAM #3 initiated a third DIRECT MODE OF ATTACK (OFFENSIVE) on the BRAVO Sector of the school by first breaking the clear glass glazing to the window unit adjacent to the exterior exit door of Classroom 2029 (Fine Arts Room) where they were able to reach through the created opening and "unlock" the exterior exit door (keyed knob door handle) and enter through the door opening into the interior of Classroom 2029 (Fine Arts Room) with a charged 1.5" hose line. The attack crew indicated that they were able to travel within Classroom 2029 (Fine Arts) from the exterior door opening along the folding accordion partition wall with Multi-Purpose Room 2010 with little or no difficulty and were able make their way to the interior corridor exit door leading into Corridor 2028. They indicated that they were met with heavy fire conditions (heavy fire/heat and smoke conditions) at this location (Corridor 2028) and were forced to retreat back through Classroom 2029 (Fine Arts) to the exterior of the structure. (See drawings A/2, A/5 and photographs 2, 3 and 17).

It was learned by the undersigned that at 10:57 hours a large volume of heavy smoke (black in colour) was now being observed by the fire fighting attack crews coming from within the roof cavity on both the BRAVO and CHARLIE sectors of the school. Also, flames (reddish/orange in colour) were being observed by firefighters in Classroom 2007 (Computer Room) on the rear CHARLIE Sector of the school. (See A/2 and A/14 and photographs 3 and 4).

It was learned by the undersigned that at 11:03 hours with the fire now rapidly advancing within the roof cavity and a number of Classrooms (2007 / 2008 / 2029 / 2010 / 2017 and 2017-A) Corridor 2028 and Library 2011 on both the BRAVO and CHARLIE sectors of the structure, Assistant Fire Chief Smith (Safety Officer) gave the order for all "interior" ATTACK TEAMS present within the burning structure to "vacate" the burning structure "immediately" and the fire

ground operations went to an INDIRECT MODE OF ATTACK (DEFENSIVE) with the use of charged 2.5" and 1.75" inch hose lines, monitors and deck guns in order to suppress the fire. Later, they were assisted in the suppression of the fire by an "elevated platform aerial truck" providing an elevated water stream. (See drawings A/1, A/2, A/ 14 and photographs 1-5).

SITE SECURITY - 3291 HAPPY VALLEY ROAD THURSDAY 2004/10/14 - FRIDAY 2004/10/22

It was learned by the undersigned that the fire scene located at HAPPY VALLEY ELEMENTARY SCHOOL 3291 Happy Valley Road, Langford, BC had been secured in the initial stages of the fire by both the on scene presence of the City of Langford Fire Service and members of the West Shore RCMPolice during the suppression and salvage and overhaul activities. The on-site security was further maintained on a 24 hours basis during the fire investigation process by the on scene presence of members of the West Shore RCMPolice until Tuesday 2004/10/19 at 18:00 hours at which time a local private security company, Paramount Security Inc., Bruce LOCKHART company representative, (727-8702) was commissioned by the insurer of the school structure to continue the fire scene security on a 24 hour basis during the remaining days of the on scene fire investigation. (See drawings S/1, S/2 and photographs 1-14).

ARRIVAL AT THE FIRE SCENE BY UNDERSIGNED - MONDAY 2004/10/18

The undersigned arrived at the fire scene located at HAPPY VALLEY ELEMENTARY SCHOOL on Monday 2004/10/18 at approximately 11:45 hours after a short introductory meeting held at the City of Langford Fire Rescue Service, Hall #1, Langford, BC This meeting brought together a number of the regulatory agencies that would be involved in the fire investigation of the HAPPY VALLEY ELEMENTARY SCHOOL fire. (See drawings S/1,S/2,A/1-A/5).

The following regulatory agencies had representatives present or could be contacted by telephone:

- **Office of the Fire Commissioner**
  Ray AITKEN - lead investigator (Prince George Regional Office, Chilliwack, BC)
  Kempton QUON - investigator (Coastal Regional Office, Victoria, BC)

- **Langford Fire Rescue Service, Langford BC**
  Assistant Fire (Fire Prevention) Chief Kerry ZADO
  Fire Prevention Inspector Lance CAVEN

- **West Shore RCMPolice, Major Crimes Unit, Langford, BC**
  Constable Phil MACDONALD
  Constable John FERGUSON

- **RCMPolice, Foresenic Identication Section, Victoria, BC**
  Corporal Doug WALMAN

- **Provincial Gas Safety Branch, Victoria, BC**
  Gas Safety Officer
  Doug SPELLER

- **Provincial Electrical Branch (by telephone contact) Victoria BC**
  Electrical Safety Officer
  Ted GILBERT

- **Canine Arson Detection Service**
  Dexter Detection Dog Services, Surrey, BC
  Paul MAHILL (owner / operator)
  Female Observer

PRELIMINARY EXTERNAL / INTERNAL SURVEY OF THR FIRE SCENE

It was learned by the undersigned and later verified by reviewing School District #62 (Sooke) construction drawings, that the HAPPY VALLEY ELEMENTARY SCHOOL, 3291 Happy Valley Road, Langford, BC had a long history in the community dating back some 50 plus years. The original school structure located at the present location on the school premises was constructed in the early 1950's and has gone through a number of construction phases consisting of additions and alterations (such as classrooms, a library, a gymnasium and a number ancillary rooms) within its lifetime (1953-2004). (See drawings S/1,S/2,T/1,A/1,A/2 and photographs 1-14).

The undersigned arrived at the fire scene located at HAPPY VALLEY ELEMENTARY SCHOOL 3291 Happy Valley Road, Langford, BC on Monday 1004/10/18 at 11:45 hours and proceeded to conduct a preliminary external / internal examination of the fire scene to observe the extent and location of heaviest structural fire damage done to the school by the fire. Also, to gain knowledge of materials and methods of construction used throughout the school structure in order to understand the important role they played in the fire behaviour such as fire and heat pattern indicators, avenues of fire travel and spread and the ventilation points with regards to the fire progression. Further, to observe the fire scene with regards to placement of fire fighting apparatus, the location of exposures (natural gas meters, electrical service lines, neighbouring residence, wildland (trees and vegetation) and parked vehicles), and observing the internal and external evacuation routes taken by the students and staff in order to reach the safe refuge area located at the front ALPHA Sector of the school (playground). (See drawings S/1, A/1- A/7 and A/14).

The undersigned began the external / internal perimeter examination on the front ALPHA Sector of the school structure and immediately observed that the fire had been contained by the firefighting crews and prevented from penetrating into the lower floor level at the front north west corner of the school. This area on the lower level of the school structure housed the Electrical Service Rooms 1001 / 1002 (locations of electrical / fire alarm / security service panels for the school), the adjoining Classroom [ ](teacher) and her[ ] students and the Main Office (Administration Area) complete with supplemental offices. (See drawings S/1,A/1,A/2 and photographs 6-8).

It was observed by the undersigned that the 2 electrical service rooms 1001 / 1002 and Classroom 1003 located on the lower level of the school received "no" structural fire damage from the fire but received minimal (light) water damage throughout due in part to the suppression activities taking place in the classroom block above on the upper floor level of the school. Also, Classroom 1003 being located between the Electrical Service rooms 1001 / 1002 and the Main Office 1005 (Administration Area) on the lower floor level received extensive water damage throughout resulting in the collapse of a number of suspended acoustical ceiling tiles and a build-up of water on the vinyl tile flooring. Further, Classroom 1003 received minimal heat / smoke (soot) damage throughout as the result of its exposure to Main Office 1005 (Administration). (See drawing A/1 and photographs 6-8, 15 and 16).

The remaining rooms on the lower floor level of the school received more extensive structural fire damage. This was due in part to the upper floor collapsing into the lower floor at Main Office 1005 and the Washrooms 1010 / 1011, Staff Room 1009, Meeting Room 1008, Storage / Change Rooms 1012 / 1014 and Furnace Rooms 1015 / 1016. (See drawing A/1 and photographs 6-8).

The undersigned observed that the complete upper floor was heavily gutted by the fire with the roof assembly, a number of exterior and interior combustible (wood frame) wall assemblies and most of the combustible (wood frame) floor assembly on the upper floor consumed by the fire with the exception of a small portion of the exterior wall at the intersection of the ALPHA / BRAVO sectors (Classroom 2018 and Corridor 2027). This upper floor area consisted of Classroom's 2018 2019 the upper Corridor 2027, Washrooms, 2014 / 2015, Medical Room 2021, Staff / and 2020 Lunch Room 2022 / 2023 and the Gymnasium 2024 including Stage Area 2025 and Storage Room 2026). (See drawings A/2,A/7, A/14 and photographs 6-8,15 and 16).

The undersigned proceeded to the exterior BRAVO sector of the school structure and observed that the fire had heavily gutted an entire block of classrooms consisting of Classrooms 2017 / 2017-A (Learning Assistance Rooms), Multi-Purpose Room 2010, Fine Arts Room 2029, interior Corridor 2028 (corridor access for Library 2011, Multi-Purpose Room 2010, Fine Arts Room 2019 and Classroom 2008). The undersigned observed the complete roof / ceiling assembly of this classroom block had been consumed by the fire leaving only the exterior / interior concrete block walls and parts of some of the combustible (wood frame) exterior / interior wall assemblies standing. The interior room content in all rooms within this classroom block had been subject to extreme temperatures leaving little or no salvage of value. (See drawings A/2,A/6-A/11 and photographs 1,2,17 and 18).

The undersigned proceeded to the rear CHARLIE sector of the school and observed that the fire had heavy gutted an entire block of classrooms consisting of Classrooms 2008, Classroom 2007 (Computer Room), Washroom's 2004 / 2005 / 2006 and Corridor 2027. The undersigned observed that the complete roof / ceiling assembly above this classroom block had been consumed by the fire, leaving only the exterior / interior concrete block walls standing and parts of some of the combustible (wood frame) exterior / interior wall assemblies destroyed in Classrooms 2007 (Computer Room), Classroom 2008 and Washrooms 2004 / 2005 / 2006. Further, the interior room content in the classrooms, the washrooms and corridor in this classroom block had been subject to

extreme temperatures leaving little or no salvage value. (See drawings S/2, A/2 and photographs 3-5).

The undersigned proceeded to DELTA sector of the school and observed that the fire had heavy gutted an entire block of classrooms consisting Classrooms 2001 [ ] 2002 [ ] 2003 [ ] and 2013 [ ]. Also; the undersigned observed the complete roof / ceiling assembly of the classroom block had been consumed by the fire leaving only the exterior / interior concrete block walls standing and all the combustible wood exterior/interior wall assemblies destroyed in Classrooms 2001 / 2002 / 2003 and 2013. Further, the interior room content in all the classrooms in this block had been subject to extreme temperatures leaving little or no salvage of value. (See drawing A/2 and photographs 10-13).

The undersigned proceeded into the interior of the CENTER CORE sector of the school and observed that the fire had heavily gutted the entire interior contents of the schools Library 2011 and ancillary workstation 2012. Also, the undersigned observed that the complete roof / ceiling assembly (asphalt roof membrane, wood sheathing, 3 roof skylights) and perimeter clerestory windows located on the ALPHA / DELTA sector walls were consumed by the fire. The structural wood glu-lam roof beams were heavily charred and with some still standing and other collapsed leaving only the 4 perimeter concrete block walls / pilasters standing. Further, the interior room content of the Library 2011 / Workstation 2012 had been subject to extreme temperatures leaving little or no salvage value. The metal frames to corridor doors and sidelights were twisted from the heat and their glass glazing (georgian wired plate glass) was intact but very distorted. (See drawings S/2,A/2,A/7,A/9,A/10,A/11.A/14 and photographs1, 2 and 55).

- **FIRE DEVELOPMENT / SPREAD**

In the opinion of the undersigned upon completing the preliminary external / internal examination and documentation of the fire scene it appeared that the greatest degree of structural and content fire damage appeared to occur in the "BRAVO / CHARLIE / CENTER sectors of the school structure, thus suggesting that the fire was present in the BRAVO / CHARLIE / CENTER sectors in beginning or incipient stages of the fire. This was verified by teachers [ ] who, when exiting the structure at the BRAVO sector at different times (minutes apart) observed fire within Multi-Purpose Room 2010 as well as fire venting through the exterior wall window and door openings and rolling upward into the underside of the roof overhang (soffit). Also, it was verified by the first arriving fire crews that they were directed to the BRAVO sector of the school structure by the presence of moderate volumes of smoke and flames protruding from the exterior window and door openings and traveling upward into the roof overhang from within Multi-Purpose Room 2010. Therefore, with the preliminary external / interior examination completed and the visual sighting of the fire in Multi-Purpose Room 2010 by the teachers, students and firefighters noted, the fire investigation team began to concentrate their efforts within the Multi-Purpose Room 2010 in determining a cause of this structure fire. (See drawings S/1,S/2,A/2,A/5,A/7,A/10 and photographs 17-20,22,24 and 31-42).

Upon reconstructing this area (removal / repositioning room content), observing the remains of the methods and materials of construction, reading the fire and heat pattern indicators and following the avenues of fire travel / spread present, it is the opinion of the undersigned that this fire was a RAPID type of COMBUSTION in the beginning or incipient stages, located within the confines of Multi-Purpose Room 2010 and suspected to have occurred at an unknown location along the exterior wall in the vicinity of the exterior exit door and a window unit with glass glazing. (See drawings A/2,A/5,A/6,A/7,A/8,A/9,A/10,A/11 and photographs 34-42).

It is the opinion of the undersigned that a "target fuel" namely the combustible paper product (black construction paper) that had been placed on the interior surface of the 2 window units (glass glazing) prior to the fire was ignited in the initial stages by a DIRECT FLAME impingement from an undetermined location and contributed to the rapid growth of this fire in the beginning or incipient stages. Upon ignition of the combustible paper product (black construction paper) the fire rapidly traveled upward (vertically) in a "plume" using the black construction paper affixed to the inside surface of the windows glass glazing as the main "target fuel" source and upon reaching the exposed surface of the combustible fiberboard acoustical ceiling tile (affixed to wood strapping by an adhesive) the fire began to roll over and spread outward laterally in a north / south direction by attacking the highly combustible fiberboard acoustical ceiling tiles. Eventually, the fire ignited the combustible fiberboard ceiling tiles along the intersection with the exterior wall (south sector of the room) causing them to weaken and fail and thus provided an opening to allow the fire direct access into the structural wood roof / ceiling joist assembly located above Multi-Purpose Room 2010 and into the adjacent roof overhang on the BRAVO sector of the school. (See drawings A/2,A/7,A/8,A/9,A/15,A/19 and photographs 33,36,37 and 40-42).

In the opinion of the undersigned upon the fire entering into the open roof / ceiling joist cavities in the south sector above Multi-Purpose Room 2010 and with the structural wood roof / ceiling joist running longitudinal (in an east / west direction) the fire was able to travel unimpeded outward through an open roof / ceiling cavity (18"- 24" high) directly into the structural wood roof / ceiling joist located above Corridor 2028 (directly outside the corridor door to Multi-Purpose room 2010). As the fire continued to grow in intensity within the roof / ceiling cavity above Corridor 2028 it eventually vented through the structural wood roof joist and built-up asphalt roof membrane assembly to atmosphere. Upon venting to atmosphere at this location the fire continued to attack the built-up asphalt roof membrane as well as structural wood roof framing members located above the 2 classroom blocks on the BRAVO and CHARLIE sectors of the school structure. This eventually led to the fire penetrating into the 2 classroom blocks on the BRAVO and CHARLIE sectors, Also, as the fire was growing in intensity at this location it was attacking and penetrating into the CENTER CORE sector (Library 2011) of the structure through a bank of clerestory windows located along the CHARLIE sector and the roof overhang on the BRAVO sector of the structure as well as traveling into the interior of Corridor 2028 outside Multi-Purpose Room 2010 and Library 2011. (See drawings A/2,A/11,A/15,A/16,A/17,A/18 and photographs 1-3,17,18,34-35,38,39 and 55).

In the opinion of the undersigned once the fire had gained control of the BRAVO, CHARLIE and CENTER CORE sectors of the school, the fire continued to escalate within Corridor 2028. Using Corridor 2028 as the main avenue of fire travel, the fire rapidly spread unimpeded into Corridor 2027 and the upper floor classroom block (Classrooms 2018 / 2019 / 2020 and Learning

Assistance Room's 2017 / 2017-A) on the ALPHA and BRAVO Sectors of the school. Eventually, the fire totally engulfed these 5 classrooms and the additional ancillary rooms off Corridor 2027 resulting in the fire venting to atmosphere through the window wall of the Classrooms (2018 / 2019, and 2020 and later the roof over the classrooms and ancillary rooms on the upper floor of the ALPHA sector of the school. (See drawings A/2,A/7,A/11,A/14 and photographs 1,2,6,7,17-19,25, 30 and 55).

In the opinion of the undersigned as the fire continued to escalate on the upper floor of the ALPHA sector the structural floor / ceiling assembly began to fail under the load causing the structural floor ceiling assembly / room content to fall into the lower floor and ignite the fuel load in the rooms on the lower floor level. Also, the fire continued to spread rapidly outward at both floor levels in a westerly direction into the Gymnasium 2024 and its ancillary rooms. The fire rapidly engulfed the Gymnasium 2024 and it's ancillary rooms on the upper floor level resulting in the gymnasium floor structure collapsing allowing the fire to travel into an open covered play area below. Also, the fire that had consumed the ALPHA, CHARLIE and CENTER CORE (Library) sectors of the school was continuing to move rapidly into the remaining DELTA sector classroom block of the school. Using both the structural wood roof / ceiling framing members above and the corridor openings below as a fuel supply and avenues of fire / travel spread in Corridor 2027 the fire was able to penetrate with little or no difficulty into the structural wood roof / ceiling assembly of the DELTA sector classroom block. Upon the fire attacking the structural wood roof / ceiling framing assembly in this area these structural wood members began to fail under the load. This collapsing action resulted in the fire penetrating into the interiors of DELTA sector classrooms and totally engulfing them in flames and destroying the room's content. (See drawings A/2,A/4 and photographs 1-6).

BACKGROUND ON HAPPY VALLEY ELEMENTARY SCHOOL PRIOR TO THE FIRE

It was learned by the undersigned that on the morning of Thursday, 2004/10/14, the school day began at HAPPY VALLEY ELEMENTARY SCHOOL as a normal day with nothing out of the usual happening. It was learned by the undersigned that teacher [redacted] had arrived at the school at approximately 08:00 hours that morning and opened the school doors for the students with classes to begin at 08:30 hours. [redacted] indicated that when she had entered the school that morning the school corridors were warm but her classroom was cold. [redacted] indicated that she had heard other teachers in the school had concerns with the heating in the classrooms and that School District #62 (Sooke) Maintenance Department had been made aware of their concerns. (See drawings S/1,A/1, A/2,T/1,F/1 and photographs 1-14).

It was learned by the undersigned that on the morning of Thursday 2004/10/14 there was a IEP meeting to be held in Room 2017 (Learning Assistance Classroom) on the upper floor of the school starting at approximately 08:50 hours [redacted] It was learned by the undersigned that this meeting was attended by a total of 11 persons made up of 3 staff members (Principal Bob BELCHER and teachers [redacted] and 8 other persons (social workers / persons of interest) [redacted]

[ ] as well as 2 identified female participant. (See drawings A/2, A/6 and A/7).

It was learned by the undersigned that at approximately 10:11 hours Thursday, 2004/10/14 the Principal of the school Bob BELCHER excused himself from the IEP meeting in the Learning Assistance Room 2017 on the upper floor as he indicated that he had to return to his office to make the morning announcements on the PA (public address) system prior to the beginning of recess at 10:15 hours that morning. (See drawings A/2 and A/3).

It was learned by the undersigned that the IEP meeting in Learning Assistance Room 2017 on the upper floor lasted till approximately 10:15-10:20 hours that morning at which time the meeting was adjourned. It was learned by the undersigned that some of the participants remained for a few minutes following the IEP meeting in Learning Assistance Room 2017 and then began leaving the upper floor of the school by using the same route as they had entered the school (main front entrance/ center stairway). (See drawings A/3 and A/4).

At approximately 10:23 hours while some of the participants from IEP meeting in Classroom 2017 were leaving the school and the students and staff were on their morning recess break the schools monitored fire alarm system activated (alarm bells ringing). As some of the participants of the IEP meeting were in different locations in the school (upper floor corridor / central stairway) when the schools fire alarm system activated (fire alarm bells ring) they quickly exited the building along with a number of staff and students and made their way to the front parking lot of the school where they were told by a staff member that there was a "confirmed or real fire" and that they might want to move their vehicles before the arrival of the fire apparatus.(See drawings A/3,A/4,A/6,A/7 and photographs 6 and 7).

It should be noted that upon giving statements to the West Shore RCMPolice, Major Crimes Section, 3 female participants of the IEP meeting held in Learning Assistance Room 2017,[ ] indicate that approximately 10:00-10:15 hours while present in Learning Assistance Room 2017 they all smelled an odour like smell similar to burning coffee (tarry smell). They all indicated that they observed no smoke at that time. (See drawings A/2 and A/6).

It was learned by the undersigned that at approximately 09:00–09:30 hours Thursday, 2004/10/14 Multi-Purpose Room 2010 was occupied by staff members [ ](Teaching Assistant),[ ](Teaching Assistant)[ ](Teaching Assistant) (Teaching Assistant) to assist her . (See drawings A/2,A/6,A/7 and A/8).

[redacted] morning of Thursday, 2004/10/14 [redacted] immediately left the room, leaving [redacted] (Teaching Assistant), [redacted]

[ ](school volunteer helper) in Multi-Purpose Room 2010. Upon departing Multi-Purpose Room 2010, at approximately 09:20-09:30 hours,[ ](Teaching Assistant)[ ]returned to Classroom 2019 and teacher[ ](a school volunteer helper) departed the Multi-Purpose Room 2010 and proceeded into Library 2011 that was located across Corridor 2028 from Multi-Purpose Room 2010. (See drawings F/1,A/2,A/6 and A/7).

It was learned by the undersigned that as they all departed from Multi-Purpose Room 2010 they used the interior exit door leading into Corridor 2028.[ ]indicated that the interior exit corridor door to Multi-Purpose Room 2010 was left in the closed position but was not latched (not secured). Also, they indicated that the exterior exit door to Multi-Purpose Room 2010 was never opened while they were present in the room and was in the closed position and thought to be locked (secured) upon their departure. It was learned by the undersigned that on the evening of Wednesday 2004/10/13 the[ ]of the school,[ ]had checked all the exterior doors of the school prior to her departure that evening and she indicated that all the exterior doors were in the locked (secured) position at that time. Also, it should be noted that the locking system for all the schools exterior / interior doors is controlled by master keyed system and the only known persons with keys to the school were the school staff (principal, teachers, teaching assistants and custodian) and the school district maintenance personnel. (See drawings A/2, A/7,A/11 and photographs 20-21 and 26-29).

It was learned by the undersigned from speaking with different members of the teaching staff that the area outside the classroom block on the BRAVO sector of the school was a restricted area that students were not allowed to access during school hours It was learned by the undersigned that Multi-Purpose Room 2010 had been recently cleaned-up by the staff and students and was being used at the time of the fire for different student activities and the storage of school equipment and books. Like a dark room for a special needs student, the storage of audio equipment (television set on trolleys), numerous textbooks / novels (shelving units), teacher's arts and craft materials, desks, chairs, blackboards (movable), piano, storage cabinets and obsolete computers. Also, there was a sink and counter / cabinets allowing for different activities such as arts and crafts to take place. (See drawings A/7,A/8 and photographs 1,2,17-19,31-32).

The undersigned learned that[ ](Teaching Assistant) and[ ]had been given permission from the school administration to use Multi-Purpose Room 2010 as a dark room.[ ]indicated she was given permission to cover the 2 exterior windows in Multi-Purpose Room 2010 with black construction paper in order to darken the room for the different activities she was involved with,[ ][ ]indicated that some of their activities involved arts and crafts and the use of 2 black lights (fluorescent tubes with metal frames) and a vision box.[ ]indicated that these were electrically energized appliances and were on a desk located along the exterior wall adjacent to the exterior exit door and were plugged into 2 duplex wall outlets. Further,[ ]indicated that on the morning of Thursday 2004/10/14, she and[ ]had not been present in the Multi-Purpose Room 2010. (See drawings A/2,A/8,A/12 and photographs 37 and 38).

It was learned by the undersigned that on the morning of Thursday, 2004/10/14 the students at HAPPY VALLEY ELEMENTARY SCHOOL had been let out for their morning recess at 10:15 hours when at 10:23 hours (verified by teacher [ ]watch) and approximately halfway through the schools morning recess, the schools monitored fire alarm system activated (alarm bells ringing) giving the first real indication of a problem. (See drawings S/1.S/2,A/2,A/4 and A/6).

It was learned by the undersigned that teacher[ ]was in her classroom with[ ]students,[ ]who were completing their homework assignment when the schools fire alarm activated (fire bells ringing).[ ] indicated[ ]had been excused for recess earlier.[ ]and the[ ]students upon hearing the fire alarm system activate (fire alarm bells ringing) immediately exited Classroom[ ]on the upper floor and traveled across Corridor 2027 and exited the school structure through a set of exterior double leaf exit doors on the BRAVO sector of the school. Upon[ ]and her[ ]students exiting the structure,[ ]observed the exterior door to Multi-Purpose Room 2010 in the open position (approximately 75 degrees).[ ]told her[ ]students to stay at the exterior exit stairs on the BRAVO sector while she went to investigate.[ ]indicated that she observed no person or persons present in the area at this time other than her and her[ ] students. (See drawings S/1,S/2,A/2,A/4,A/6,A/7,A/10 and photographs 1,17-21,25-29).

Upon arriving at the open exterior exit door to Multi-Purpose Room 2010[ ]indicated that she observed the black construction paper on the inside surfaces of the rooms 2 exterior windows units was on fire and upon investigating further she looked through the open exterior exit door into Multi-Purpose Room 2010 and she could see fire on a desk and at the wall mounted bulletin board to her left.[ ]immediately shut the exterior exit door to the Multi-Purpose Room 2010 and returned to the location she had left her[ ]students[ ] and her[ ]students met up with teacher[ ]and they all made their way to the front of the school (playground) where a number of[ ]and[ ]students were beginning to line up in their designated class location. (See drawings A/2,A/7,A/8,A/9,A/10 and photographs 1,17-20,34,37-39 and 41).

It was learned by the undersigned that upon activation of the schools fire alarm system (alarm bells ring) teacher[ ]was in her classroom drinking a cup of tea and talking to another teacher[ ]. She immediately got up grabbed her clipboard with class list and then turned "off" the lights to her classroom and exited her Classroom by traveling into Corridor 2027 and turning left. She proceeded down Corridor 2027 to the end of the corridor and exited through a set of exterior double exit doors to the exterior of the structure on the BRAVO Sector.[ ]indicated that she immediately observed smoke and later flames protruding through the window openings and then traveling upward into the roof overhang (soffit) from Multi-Purpose Room 2010.[ ]indicated that she met up with teacher[ ]who indicated that it was a "confirmed or real fire". They both continued to the front of the school (playground) with[ ]students where she eventually met up with her students who were lining up in their designated class location. (See drawings A/4,A/7,A/10 and photographs 1 and 17-20).

It was learned by the undersigned that upon the activation of the schools fire alarm system (fire alarm bells ring) teacher [ ] was in her classroom having just returned (approximately 2-3 minutes earlier) from the IEP meeting held in Learning Assistance Room 2017. [ ] indicated she picked up her clipboard with her class list and then vacated her Classroom [ ] on the upper floor and entering into Corridor 2027 she turned to her right, and traveled down Corridor 2027 and eventually out through a set of exterior double leaf exit doors located between Classroom 2013 and Gymnasium 2024. Upon reaching the exterior of the school [ ] made her way around to the front of the school (playground) ALPHA Sector and met up with her substitute teacher [ ] and her students who were lining up in their designated class location. (See drawings A/2,A/4 and photographs 1,7-9,11 and 12).

[ ] indicated that she left her students with her substitute teacher on the front playground and as duty teacher she met with the principal Bob BELCHER. [ ] indicated that BELCHER request she re-enter the school and check the upper floor area of the school for any students. [ ] indicated she entered the school through the front main doors on the lower floor and proceeded to travel up the center stairway to the upper floor of the school. Upon reaching the upper floor at Corridor 2027 she turned right and traveled down Corridor 2027 checking (calling out) the upper floor rooms (classrooms, washrooms and medical room) for any students or staff. Upon reaching the corridor door to Classroom 2017-A she immediately observed the presence of smoke coming from Classroom 2017-A. [ ] indicated she immediately shut the corridor door to Classroom 2017-A and retreated back down Corridor 2027 closing some classroom doors on her way to her own Classroom [ ] where she retrieved her purse. [ ] then proceeded down the center stairway to the lower floor where she observed the principal Bob BELCHER, (calling school board offices) and the [ ] (calling Emergency E 911) on the telephone. [ ] exited the school through the main front lower floor entry / exit doors on the lower floor and returned to the front of the school (playground) to meet with her substitute teacher and her students [ ] indicated that the fire was now quite noticeable on the roof of the school. (See drawings A/2,A/4 and photographs 6 and 7).

It was learned by the undersigned that [ ] and her morning [ ] class upon activation of the fire alarm system (fire alarm bells ringing) exited through the exterior exit door of Classroom 2001 on the DELTA sector of the school and made their way to the front of the school (playground) were they lined up in their designated area. Also, it was learned by the undersigned that upon the activation of the fire alarm system (fire alarm bells ringing) the remaining teaching staff, administration staff and a number of students that where still present in the school made their way to the main exterior exit doors located on the both the ALPHA and DELTA sectors of the structure. (See drawings A/2, A/4 and photographs 7-9,11 and 12).

Further, it was learned that the principal Bob BELCHER was outside on the playground with his students during the morning recess and the first indication that he was aware of a problem was when some of his students came up and advised him that the schools fire alarm system had activated (fire alarm bells ring) and a number of staff and students were leaving the school structure. (See drawing S/1 and photographs 6-12).

It was learned that upon activation of the schools fire alarm system (fire alarm bells ringing) [redacted] a school volunteer helper) was present in Library 2011 when she observed dark black smoke beginning to come into the Library 2011 from the 2 open doors leading Corridor 2028. [redacted] immediately informed teacher [redacted] that it was a confirmed or real fire and indicated they should both immediately vacate the school. (See drawings A/4,A/10 and A/11).

It was learned by the undersigned that upon activation of the schools fire alarm system (fire alarm bells ringing) the evacuation of the students and staff was carried out in professional manner and within a few minutes the student's and staff had arrived at their designated refuge area and began lining up and taking attendance.

BUILDING AREA – BUILDING CONSTRUCTION OF HAPPY VALLEY ELEMENTARY SCHOOL

- **BUILDING AREA**

It was learned by the undersigned that at the time of the structure fire, HAPPY VALLEY ELEMENTARY SCHOOL, 3291 Happy Valley Road, Langford, BC had a student enrollment of approximately 200 students (Kindergarten to grade 6) with approximately 30-35 staff and administrative support personnel. (See drawings S/1,S/2,T/1,A/1,A/2 and photographs 1-14).

It was learned by the undersigned from maintenance representatives of SCHOOL DISTRICT #62 (Sooke) and reviewing the architectural drawings that the elementary school known as HAPPY VALLEY ELEMENTARY SCHOOL was constructed in different phases over the years starting with the original structure in the 1950's and continuing with major additions in years 1965, 1967, 1970, 1972, 1973 and 1975 in addition to a number of interior alterations and renovations being complete through to the year 2004. (See drawings S/1,S/2,A/1,A/2 and photographs 1-14).

The A/2 (assembly occupancy) elementary school was initially constructed on the property at 3291 Happy Valley Road a distance inward of some 200'-0" feet from Happy Valley Road the main throughway for vehicle traffic traveling past the school Access into the school structure was provided by a number of walkways and a long driveway (asphalt base) that provided access to both a front ALPHA Sector and rear CHARLIE Sector designated parking areas for staff and visitor vehicles. (See drawing S/1 and photographs 1,5 and 6-14).

It was observed by the undersigned that the school structure was constructed on a stepped site contour landscape, as a 2 story (original structure), a number of 1 storey classroom additions, a gymnasium addition and a 11/2 storey center core (Library) block of a combustible non combustible (concrete block / steel columns / beams) and combustible (wood frame / laminated glu-lam / wood beams) construction. Also, the A/2 (assembly occupancy) elementary school structure had a combined building area of approximately 27,135 square feet. The lower floor level consisted of approximately 5,170 square feet in building area and upper floor level consisted of approximately 21,065 square feet in building area. (See drawings S/1,S/2,A/1,A/2 and photographs 1-14).

The A/2 (assembly occupancy) elementary school structure was provide with a 24 hour monitored fire alarm system (Price Alarms monitoring company) and was protected with a combination fixed temperature / rate of rise heat detection system (135 degrees Fahrenheit setting) provided in all rooms throughout the school structure. Also, the school structure was provided with first aid portable multi-purpose ABC (dry chemical) fire extinguishers at various locations throughout the school structure.

The learned that the A/2 (assembly occupancy) school structure was subject to 2 fire inspections a year by the City of Langford Fire Rescue Service with the last fire inspection taking place on Thursday, 2004/09/09.

- **BUILDING CONSTRUCTION**

- **FRONT (ALPHA SECTOR) - 2 STOREY CLASSROOM BLOCK,ADMINISTRATION OFFICES, GYMNASIUM AND ANCILLARY ROOMS**

  The lower level of the front APLHA Sector of the school consisted of the Electrical Service Rooms 1001 / 1002, Classroom 1003, Office (Administration) Rooms 1004 / 1005 / 1006 and 1007, Meeting Room 1008, Staff Room 1009, Washrooms 1010 / 1011, Change / Storage Rooms 1012 / 1013 / 1014, Furnace Rooms 1015 / 1016 and the open Play Area under the Gymnasium 2024. The upper floor of the front ALPHA Sector consisted of Washrooms 2014 / 2015, Classrooms 2018 / 2019 / 2020, Medical room 2021, Lunchroom 2022 / 2023, Gymnasium 2024, Stage 2025, Storage room 2026 and Stairs 2030. (See drawings A/1,A/2 and photographs 6-10).

  The front ALPHA sector of the school was constructed as a 2 storey structure of a combination noncombustible / combustible construction on concrete footings and foundation walls. The structure was built with a flat roof of wood frame construction with a built-up asphalt roof membrane. The exterior walls were constructed of a combination non-combustible concrete block / steel columns / trusses (lower level gymnasium) and a combustible wood frame / fiberglass batt insulation / glass windows with wood / metal frames (lower and upper floor). The interior walls and ceilings were a combination of drywall (walls) and fiberboard acoustical ceiling tile. The lower / upper floors of the school were protected with a vinyl floor covering on a concrete slab floor (lower level) and a wood frame construction (upper floor). The lower / upper floors had a combination of wood / metal doors frames with some having glass glazing window units .The lower / upper floor room were serviced with electrical energy (fluorescent light fixtures, wall switches, wall outlets) and heated with 4 natural gas forced air furnaces complete with thermostats and metal ducting. (See drawings S/1,S/2,A/1,A/2 and photographs 6-10).

- **SIDE (BRAVO SECTOR) – 1 STOREY - CLASSROOM**

  The BRAVO sector classroom block consisted of Learning Assistant Rooms 2017 / 2017-A, Multi-Purpose Room 2010, Fine Arts Room 2029 and Corridor 2028. (See drawings A/2,A/6, and photographs 1,2,17-19, 23 and 25).

- **REAR (CHARLIE SECTOR) – 1 STOREY - CLASSROOM BLOCK**

  The CHARLIE sector classroom block consisted of Classroom 2008, Classroom 2007 (Computer Room), Washrooms 2005 / 2006 and Corridor 2027. (See drawing A/2 and photographs 3-5 and 53).

- **SIDE (DELTA SECTOR) – 1 STOREY - CLASSROOM BLOCK**

  The DELTA sector classroom block consists of Classrooms 2001 / 2002 / 2003 and 2013. (See drawing A/2 and photographs 10-13).

The BRAVO, CHARLIE, DELTA sector classroom blocks were constructed at different times but were very similar in the use of construction methods and materials. The 3 classroom blocks were constructed as 1 storey structures of a combination noncombustible (concrete block walls) / combustible (wood frame walls / wood roof framing / laminated structural wood beams). Constructed with concrete slab floor, footings and foundation walls. The classroom blocks had flat roofs and were constructed of combustible wood frame construction (sawn structural wood roof / ceiling joist with laminated structural wood beams with a combination of wood shiplap boards and combustible plywood roof sheathing on a protective built-up asphalt roof membrane and insulated with fiberglass batt insulation. The ceilings were constructed of combination acoustical fiberboard (classroom) and drywall (painted). The interior walls were constructed as a combination of concrete block (painted) and combination steel / wood studs with drywall (painted). Multi-Purpose Room 2010 and Fine Arts Room 2029 were separated by a vinyl covered folding partition wall. The exterior walls were a combination of concrete block (painted) and wood frame (overlaid plywood / wood stud) construction. The floors were covered with a combination of vinyl / vinyl asbestos tiles and carpeting. The interior / exterior doors and frames were constructed of wood construction (painted); the windows were constructed of metal (aluminum) frames complete with clear glass glazing. The classrooms were serviced with electrical energy (wall switches, duplex wall outlets and fluorescent light fixtures) and heated with individual electric floor or wall mounted heaters.

- **MIDDLE (CENTER CORE SECTOR) - 1 ½ STOREY - LIBRARY BLOCK**

  The Middle (Center Core Sector) - Library block consisted of Library 2011 and Workstation 2012.

The Center Core sector Library block was constructed as a combination noncombustible (concrete block walls) / combustible wood frame construction on concrete footings, foundation walls and slab floor. The structure had a flat roof and was constructed of structural wood glu-lam beams, wood sheathing, fiberglass batt insulation, with a protective built-up asphalt roof membrane and provided with 3 glazed roof skylights. The exterior / interior walls were constructed of a combination noncombustible (concrete block) / combustible (wood frame) construction with clerestory window units on the ALPHA and CHARLIE sectors. The floors were covered with a combination carpet / vinyl flooring. The doors were constructed of metal (aluminum) frames with sidelights and were glazed with wired plate glass. The room was serviced with electrical energy

(wall switches, duplex wall outlets and fluorescent light fixtures) and heated by electrical roof mounted heating unit. (See drawing A/2 and photograph 55).

FIRE CAUSE / DETERMINATION - SIX CAUSUAL FACTORS

- AREA OF ORIGIN

In the opinion of the undersigned upon interviewing the Principal, Bob BELCHER, teachers [ ] interviewing the first arriving firefighters, talking to other staff witnesses, reviewing the pictures and videos of the fire from the fire service, the media and neighbors / witness, reconstructing the fire scene and reading the fire and heat pattern indicators and the avenues of fire spread, the AREA OF ORIGIN of this A/2 (assembly occupancy) elementary school structure was located on the BRAVO sector of the school in the east sector of Multi- Purpose Room 2010. See drawings A/2,A/6,A/7,A/8, A/20 and photographs 1,2,17-26, 31-42 and 55).

This was evident by:

- The observations of teacher [ ] when upon exiting the school observed the exterior door to Multi-Purpose Room 2010 in the open position and observed fire on the inside of the room at the desk, wall bulletin board and paper covering the inside surface of the glass window units.
- The observations of teacher [ ] when exiting on the BRAVO sector of the school, observed the fire coming out of the windows of Multi-Purpose Room 2010 and rolling upward to the underside of the roof overhang (soffit) and fascia.
- The observation of the first arriving fire crew indicating the Multi-Purpose Room 2010 on the BRAVO side of the school was completely engulfed with flames protruding through the 2 windows and door opening and traveling into the roof overhang (soffit/ fascia).
- The observations upon viewing the news media videos and the different photographs submitted by onlookers of the fire's early location and the avenues of fire travel / spread.
- The total destruction of the structural wood roof / ceiling assembly over Multi-Purpose Room 2010 (asphalt roof membrane, plywood sheathing, 2"x14"structural sawn roof / ceiling joist, fiberglass batt insulation, 1"x 4"wood strapping and acoustical fiberboard ceiling tiles.
- The high heat pattern indicators (geometric patterns) observed on the remaining vertical surfaces of exterior combustible wood frame wall, the structural laminated wood beam (partial consumption, deep alligator charring), the remains of the interior wood / drywall partition walls (pointer and arrow patterns), in and around the sink and counter area, the remains of the exterior wood exit door and frame (V-patterns on vertical surfaces), the remains of the teacher's desk and the 2 tier wood constructed book shelf unit located on each side of the exit door along the exterior wall of Multi- Purpose Room 2010.

- The high heat pattern indicators (white colour / clear burn patterns) observed on the exposed inside surfaces of the exterior concrete block walls.

- The melting and distortion of metals / glass from heating such as the tops / sides of the aluminum window frames, the top and side alloy metal frames of the bulletin / black boards the different plastic room content (chairs, tables, television sets and VCR'S) and the breaking of the window glass into large irregular shards.

- The melting of the vinyl covering and the distortion of the metal frame (slats) / track of the according (folding) partition wall from the heat of the fire.

- POINT OF ORIGIN

In the opinion of the undersigned, upon first examining and then reconstructing the remaining structural building components (walls, doors etc,) and the different room content in the AREA OF ORIGIN as well as reviewing the fire and heat pattern indicators and the avenues of travel of the fire (in the initial and secondary stages) with the fire fighting crews it became obvious that the exact the POINT OF ORIGIN of this fire could not be determined by the undersigned due the extensive structural and content damage done by the fire in Multi-Purpose Room 2010.(See drawings A/2,A/6,A/7,A/8,A/9,A/10 and photographs 33,37,38,41 and 42).

- IGNITING OBJECT

Upon interviewing principal Bob BELCHER, teachers [ ], teaching assistants( ) listening to cassette recordings of the statements taken by West Shore RCMPolice, Major Crimes Unit, of some of the different participants in the IEP meeting in Room 2017 (Learning Assistant Room) the morning of the fire and reviewing the important time's leading up to the activation of the schools fire alarm system (ring of alarm bells), it is the opinion of the undersigned that this fire was a very rapid type of combustion in the beginning or incipient stages and that the IGNITING OBJECT of this fire would have to generate a very high heat source similar to a NAKED or DIRECT FLAME (match / lighter / candle) in order to ignite the combustible fuel load present.

Therefore, in the opinion of the undersigned the IGNITING OBJECT of this fire was suspected to be a DIRECT or NAKED FLAME (match / lighter). (See drawings A/2,A/6,A/7 and A/8).

- FORM OF HEAT OF IGNITION

In the opinion of the undersigned, upon examining the AREA OF ORIGIN for any probable accidental or suspicious sources of ignition present, it was possible to eliminate all accidental or suspicious sources of ignition in the AREA OF ORIGIN of this fire with the exception of CHEMICAL ENERGY (HUMAN ELEMENT).

ELIMINATION OF ACCIDENTIAL SOURCES OF IGNITION

- **ELECTRICAL ENERGY**

The fire investigation team requested the assistance of the local Provincial Safety Authority, Victoria, BC by contacting Ted GILBERT, Electrical Safety Officer for the Langford area to assist in the fire investigation in order to examine the electrical energy as a source of ignition of this fire.

Ted GILBERT, Provincial Electrical Safety Officer arrived at the fire scene on Wednesday morning, 2004/10/20 and was met by the undersigned and other members of the fire investigation team. GILBERT was requested by the undersigned to assist the fire investigation team in the examination of all aspects of the electrical energy service located within the school and in particular the electrical energy service's as it was associated with the Multi-Purpose Room 2010. (See drawings A/2,A/6,A/7,A/12,A/13 and photographs 43-50,52-54).

GILBERT started his examination by accessing the 2 Electrical Service Rooms 1001 / 1002 on the lower floor of the structure that were not structurally damage by the fire. GILBERT examined the wall mounted electrical service panels, their associated circuitry / fusing and documented their conditions. GILBERT indicated to the undersigned that everything appeared normal with the exception of a few circuits that had their circuit breakers tripped. GILBERT indicated that because of the extent of structural damage it was going to be very difficult to examine the different circuitry once they had left the 2 Electrical Service Rooms 1001 / 1002. (See drawing A/2 and photographs 53 and 54).

GILBERT was requested to examine an external roof mounted electrical heating unit that was mounted on the roof above Corridor 2027 and between Classroom 2013 and Library 2011. This electrical unit had been removed from its original position in the fire debris and placed at the rear of the school. The fire investigation team had been informed of some concerns with this roof mounted electrical heating. Upon completing his examination of the roof mounted electrical heating unit he was of the opinion that the faults present were external and not internal caused by the fire as it progressed and spread. (See drawing A/2 and photograph 52).

GILBERT was then requested to examine an electrical baseboard heater, an electrical safety box, an electrical outlet box and a BX Armour electrical circuit cable in Multi-Purpose Room 2010. Upon examination of these electrical service items, GILBERT indicated that in his opinion due to the extent of fire damage he was unable to determine if these items were the source of ignition of this fire and therefore could not eliminate the Electrical Energy at this location. (See photographs 44-49).

The fire investigation team also examined these electrical items but in the opinion of the undersigned there were no fire and heat indicators in and around these electrical devices to suggest that an electrical energy source and a combustible fuel load had come together and initiated a fire.

Further, the fire investigation team examined additional electrical service equipment located in Multi-Purpose Room 2010. The fire investigation team examined the remains of the surface mounted conduit to the electrical fluorescent light fixtures, the wall switches, 1 electrical audio outlet (nothing plugged "in" with faceplate intact, 1 duplex wall outlet (nothing plugged "in" cover

plate intact) and 2 wall mounted duplex outlets with plastic faceplate consumed by the fire (1 wall outlet with 2 black lights plugged "in" and 1 wall outlet with a light duty extension cord plugged "in"). All the indicators present indicated that the fire damage to these different electrical audio and duplex wall outlets, the appliances plugged "in" and their conductors (wiring) were external rather than internal and caused by the fire as it progressed and spread. (See drawings A/2,A/12,A/13 and photographs 31,34 and 38).

In the opinion of the undersigned, upon examining all the facts, the Electrical Energy was eliminated as a source of ignition in the AREA OF ORIGIN and therefore was "not" the source of ignition of this fire.

- SMOKING MATERIALS

In the opinion of the undersigned, the SMOKING MATERIALS were eliminated as a source of ignition of this fire on the basis that the last occupants of the Multi- Purpose Room 2010 indicated that they were non-smokers and there was a very strict policy for smoking around the school. Further, this fire was a very rapid type of combustion in the beginning or incipient stages and was "not" indicative of SMOKING MATERIALS as a source of ignition of this fire.

- SPONTANEOUS COMBUSTION

In the opinion of the undersigned, upon interviewing the last persons present in Multi-Purpose Room 2010, reviewing the sketches prepared by the teaching assistants[ ]and examining the remaining fire debris during the reconstruction of the fire scene, the undersigned found "no" physical evidence of an internal (exothermic) heat source that might cause SPONTANEOUS COMBUSTION to occur and therefore SPONTANEOUS COMBUSTION was eliminated as a FORM OF HEAT OF IGNITION of this fire.

- MECHANICAL SERVICES (NATURAL GAS APPLIANCES / SERVICE)

The fire investigation team requested the assistance of the local Principal Safety Authority, Victoria, BC by contacting Doug SPELLER, Gas Safety Officer for the Langford area, to assist in the fire investigation by examining the natural service and appliances for the school.

Doug SPELLER arrived at the school on Monday 2004/10/18 at approximately 11:45 hours and was requested by the fire investigation team to assist in the mechanical services (natural gas fired service, appliances and accessories).

SPELLER, in conversation with heating mechanic[ ], a gas fitter for School District #62 (Sooke) learned that there was only a 2-pound pressure of natural gas entering the school from the lower level on the front ALPHA side of the school. Also, [ ]indicated the natural gas entered the school structure in a steel 1" inch pipe and the pipe on SPELLER'S inspection was intact. Further, the only natural gas fired appliances in the school were water heaters and furnaces located on the lower level in Furnace Rooms 1015 / 1016. The chimneys for the gas appliance, from pictures taken prior to the fire, confirm were all present. Further, SPELLER asked[ ]

and he confirmed that there were no known problems with any the natural gas service and appliances within the school and that annual maintenance had been done on all appliances. (See drawing A/1 and photographs 6-8).

Therefore, with "no" natural gas fired services or appliances present in the AREA OF ORIGIN, Multi-Purpose Room 2010, the natural gas service and appliances were eliminated as a source of ignition of this fire.

SUSPICIOUS SOURCE OF IGNITION

- CHEMICAL ENERGY (HUMAN ELEMENT)

In the opinion of the undersigned, the CHEMICAL ENERGY (HUMAN ELEMENT- **oxidization reaction)** of this fire could NOT be eliminated as a FORM OF HEAT OF IGNITION of this fire based on the fact that this fire was a very rapid type of combustion in the beginning or incipient stages.

Therefore, in the opinion of the undersigned, the FORM OF HEAT OF IGNITION at the AREA OF ORIGIN was suspected to be CHEMICAL ENERGY (HUMAN ELEMENT-**oxidization reaction**)-suspect the use of a DIRECT or NAKED FLAME (match / lighter) by the HUMAN ELEMENT.

- MATERIAL FIRST IGNITED

In the opinion of the undersigned, after interviewing the last persons in Multi-Purpose Room 2010 as to their movements and actions, reviewing the sketches showing the location of the room content interviewing the first arriving firefighters on their observations and reconstructing the fire scene in the AREA OF ORIGIN, reading the fire and heat pattern indicators and following the avenues of fire spread / travel, the MATERIAL FIRST IGNITED of this fire was suspected to be ordinary combustibles paper product. (See drawings A/7,A/8,A/9,A/11 and photographs 33,36,37 and 40-42).

- ACT OR OMMISSION

In the opinion of the undersigned, upon reviewing the statements on the last persons in Multi-Purpose Room 2010 on their movements and activities, interviewing teachers] on their observations upon exiting the school, interviewing the first arriving fire crews on their observations, reviewing the important times of the activities leading up to the activation of the school fire alarm, and the fact that an exact POINT of ORIGIN of this fire could NOT be determined the ACT OR OMISSION of this fire shall remain unknown / undetermined with suspicious overtones at this time.

PHOTOGRAPHS OF THE FIRE SCENE

- PHOTOGRAPHS

The undersigned using both an Olympus digital camera and a Pentax 35mm camera took the following photographs at the fire scene of the A2 occupancy (school structure) on Monday 2004/10/18 thru Thursday 2004/10/21.

- AREA OF ORIGIN
- EXHIBITS (physical evidence and location)
- FIRE AND HEAT PATTERN INDICATORS
- AVENUES OF FIRE TRAVEL SPREAD
- REMAINS OF STRUCTURAL BUILDING COMPONENTS OF THE
- REMAINS OF ROOM CONTENT

There were additional digital photographs taken by Investigator Kempton Kwon*, of the Office of the Fire Commissioner, Victoria and Corporal Doug WALMAN**, Victoria RCMPolice, Forensic Identification Section. These additional digital photographs of the fire scene and the exhibit locations all form part of this report.

PHYSICAL EXHIBITS - SECURED AT THE FIRE SCENE

- **PHYSICAL EXHIBITS**

EXHIBITS (physical evidence) were located, identified, photographed and secured from the AREAS OF ORIGIN on Tuesday 2004/10/19 - Thursday 2004/10/21 by the fire investigation team. The 11 EXHIBITS (physical evidence) were examined on scene by the different regulatory agencies and used to reconstruct the fire scene. (See drawing A/21).

- EXHIBIT "A" - 1 - remains of electrical extension cord (used for motorized electric Wheelchair)
- EXHIBIT "B" - 1 - black light fixture.
- EXHIBIT "C" - 1 - black light fixture.
- EXHIBIT "D" - 1 - light box.
- EXHIBIT "E" - 1 - teacher's desk.
- EXHIBIT "F" - 1 - metal electrical outlet box capped off with cover plate.
- EXHIBIT "G - 1 - metal electrical safety service box.
- EXHIBIT "H" - 1 - 8'- 0" (L) electric baseboard heater.
- EXHIBIT "I" - 1 - door handle and latching device to exterior door Multi-Purpose Room 2010.
- EXHIBIT "J" - 1 - duplex electrical wall outlet (surface mounted) 2 black lights "plugged in."
- EXHIBIT "K" - 1 - duplex electrical outlet (service mounted) 1 extension cord " plugged in."

CANINE (DOG) ARSON DETECTION SERVICE

- **"DEXTER" / PAUL MAHILL**

The fire investigation team requested the services of DEXTER DETECTION DOG SERVICES, Surrey BC on Friday 2004/10/15. Paul MAHILL (owner / operator), a female associate and his dog "DEXTER" arrived at the fire scene on Monday 2004/10/18 at approximately 11:45 hours.

MAHILL, a certified private investigator and his dog "DEXTER", a certified arson detection canine were commissioned by the fire investigation team to locate any suspicious "foreign liquid accelerants" present on the fire scene. It should be noted that "DEXTER" made "no" positive hits throughout the school and in particular the room of origin Multi Purpose Room 2010 but did show some interest in one location in the upper extremities (wall / ceiling areas) of Classroom 2008 approximately mid point along the adjoining interior concrete block wall with Fine Arts Room 2029.

Therefore, with "DEXTER" and his master Paul MAHILL unable to locate any positive "hits" within the school structure and in particular the AREA OF ORIGIN (Multi-Purpose Room 2010) of this fire and the fact that the fire investigation team that reconstructed the room of origin did "not smell or observe any physical evidence of a suspicious "foreign liquid accelerant" being present, it is the opinion of the undersigned, that no "foreign liquid accelerant" was used to accelerate this fire within the school structure. (See drawings A/1,A/2 and photograph 30).

SUMMARY

It was learned by the undersigned, that on Thursday morning 2004/10/14 HAPPY VALLEY ELEMENTARY SCHOOL, 3291 Happy Valley Road, Langford, BC was operating as normal with nothing occurring out of the ordinary. The main entry doors into the school were opened that morning, by teacher [ ] shortly after her arrival at approximately 08:00 hours, thus allowing the students access into the school for classes that began at 08:30 hours. Also, there was an IEP Meeting that morning that started at approximately 08:50 hours and was located on the upper floor of the school in Learning Assistance Room 2017. The IEP meeting was attended by 11 persons, which included 3 staff members and 8 outside participants. At 10:11 hours the principal, Bob BELCHER, one of the participants, excused himself from the IEP meeting in Learning Assistance Room 2017 so he could return to his office and make the morning announcements prior to morning recess scheduled to begin at 10:15 hours. The IEP meeting ended approximately 10:15-10:20 hours and as the participants were dispersing and returning to their vehicles located in the front parking lot of the school, the schools fire alarm activated (alarm bells ringing). (See drawings A/2,A/4,A/6,A/7 and photographs 1-14).

It was learned by the undersigned that some 15-20 minutes prior to the schools fire alarm sounding 3 of the female participants in the IEP meeting on the upper floor in Learning Assistance Room 2017-A, indicated they had smelled an odour like substance similar to that of burnt coffee in a heated pot but they all indicated that there was "no" fire or smoke present at that time. (See drawings A/2 and A/6).

Also, that morning between 09:00-09:30 hours, Multi Purpose Room 2010 was occupied by a [ ] (Teaching Assistant), [ ] (Teaching Assistant), [ ] (Teaching Assistant) had requested the assistance of [ ] Teaching

Assistant) to assist her [redacted] (Teaching Assistant) left the room immediately and was followed minutes later by [redacted] (Teaching Assistant), [redacted] (Teaching Assistant) indicated that on their departure the interior corridor door to Multi-Purpose Room 2010 was closed but not latch. Also, [redacted] indicated the exterior exit door to Multi-Purpose Room 2010 was in the closed position (thought to be locked / secured) and everything appeared normal within the room (lights and heat turned off). (See drawings A/2,A/6,A/7,A/8 and A/12 and photographs 31-42 and 55).

The first real indication of a problem within the school structure on Thursday morning 2004/10/14 was at 10:23 hours (time indicated by teacher [redacted] watch) when the schools monitored fire alarm system activated (fire alarm bells ring) throughout the school. It was learned that the majority of the students at that time were outside the school structure (on the playground) and half way through their morning recess that had started at 10:15 hours. (See drawing A/1and A/2).

It is the opinion of the undersigned, that the schools monitored fire alarm system was activated when one of the combination rate of rise / fixed temperature heat detectors (135 degrees Fahrenheit setting) tied into the fire alarm system activated in the room of origin. Upon activation of the schools monitored fire alarm system (alarm bells ringing), a trouble alarm was sent and received at 10:28 hours Thursday 2004 /10 /14 by PRICE ALARMS, 800 Block Fort Street, Victoria, BC, the 24 hour monitoring agency that was commissioned for the school. The Emergency E911 Regional Fire Dispatch Center (Langford) received the fire call at 10:28 hours, Thursday 2004/10/14 from PRICE ALARMS Victoria, BC and immediately dispatched the City of Langford Fire Rescue Service, Fire Hall #1 to the fire scene at 10:28 hours, followed by Fire Hall #2 at 10:30 hours with the first arriving fire crew from Hall #1 arriving on scene at 10:34 hours, Thursday 2004/10/14. (See drawings A/2 and A/13).

It was learned by the undersigned that upon activation of the schools fire alarm system, teacher [redacted] and [redacted] her [redacted] students (who were finishing a homework assignment) exited Classroom [redacted] through Corridor 2027 and a pair of exit doors to the exterior of the school on the BRAVO sector. Upon reaching the exterior of the structure [redacted] observe the exterior exit door to Multi-Purpose Room 2010 was in the "open" position and upon investigating further, she observed fire inside of Multi-Purpose Room 2010. Moments later teacher [redacted] exited the structure through the same exit doors as [redacted] on the BRAVO sector of the school and indicated she observed flames protruding out the tops of the 2 exterior windows and exit door and then rolling upward onto the exposed roof overhang from Multi-Purpose Room 2010. (See drawings A/2,A/4.A/7 and photographs 1,2,17,18,22 and 24-26).

Upon arrival on scene of the first fire crews of City of Langford Fire Rescue Service, they first observed and indicated heavy smoke / fire conditions on the BRAVO sector of the school with flames venting out of the 2 exterior windows and exit door openings and traveling upward onto the roof overhang from Multi-Purpose Room 2010. The Incident Commander Lieutenant Ryan YOUNG immediately recognized the conditions and severity of the fire and requested mutual aid assistance from the surrounding municipal fire service departments of Colwood, Highlands,

Metchosin, Sooke, View Royal (to standby in Langford) and Esquimalt (to standby in View Royal). (See drawings S/1,S/2,A/2,A/10 and photographs 17,18,22,24-26).

In the opinion of the undersigned upon reviewing the "time factors" on the progression of this school structure fire, eliminating all the accidental and suspicious sources of ignition with the exception of the CHEMICAL ENERGY (HUMAN ELEMENT), all the key indicators reveal that this school structure fire was a very RAPID type of COMBUSTION in the beginning or incipient stages indicative of a fire by DESIGN rather than ACCIDENTAL in cause. It is the opinion of the undersigned that this fire was initiated within minutes of the activation of the schools monitored fire alarm system when an ignition source, suspected to be a DIRECT or NAKED FLAME (match / lighter) came in contact with a suspected "prime" fuel load of ordinary combustibles (paper product) at an unknown location (point of origin) along the exterior wall in the vicinity of the exterior door / window unit within Multi-Purpose Room 2010. (See drawings A/2,A/7-A/11,A/20 and photographs 25,33,37,41and 42).

In the opinion of the undersigned, because this was a confined (compartment) type fire and ventilation controlled (excess fuel supply) in the incipient or beginning stages, the products of combustion (heat, fire gases, flames and smoke) being generated by the fire immediately began to seek additional avenues of least resistance and escape. This was achieved by using the combustible paper product (black construction paper) covering the window unit adjacent to the exit door along the exterior wall of Multi-Purpose Room 2010 as the "prime" source of fuel to spread the fire in an upward direction (vertically) and in a the form of a "plume" through the process of heat transfer (conduction, convection, radiation and direct flame impingement) towards the upper ceiling levels of Multi-Purpose Room 2010. Upon the fire reaching the upper levels of Multi-Purpose Room 2010 at the ceiling membrane the fire became impeded by the highly combustible acoustical fiberboard ceiling tile at which point it began to roll over mushroom outward (laterally) by traveling across the exposed surface of the highly combustible fiberboard ceiling, mainly in a north and south direction. (See drawings A/2,A/7-A/10,A/15,A/19 and photographs 33-42).

In the opinion of the undersigned, as the fire continued to grow in intensity namely along the intersection of the ceiling membrane (fiberboard acoustical tile) and the exterior wall (drywall) it caused the highly combustible acoustical fiberboard ceiling tile to ignite (flaming combustion) and eventually become dislodged (adhesive melting) from their fixed position namely in the south east sector of Multi-Purpose Room.2010. This action allowed the fire a direct access route into the open or unprotected roof / ceiling cavity that housed the structural wood roof / ceiling joist framing members. Due in part to the age and dryness of the building materials (structural wood framing members) as well as the methods of construction (combustible wood frame) used in construction of this classroom block, the fire was able to rapidly generate sufficient products of combustion (heat, fire gases and flame) to ignite these structural wood ceiling / roof flaming members within the open roof / ceiling cavity. This in turn allowed the fire to travel unimpeded within the open roof / ceiling cavity in both a westerly direction into the open roof / ceiling cavity above Corridor 2028 (outside Multi-Purpose Room 2010) and also, an easterly direction into the roof framing members of the roof overhang located on the BRAVO sector of the school. (See drawings A/2,A/7,A/8,A/9,A/20 and photographs 1,2,33,34 and 35).

In the opinion of the undersigned, due to the methods and materials of construction the fire rapidly attacked and penetrated through the roof assembly (framing / protective membrane) over Corridor 2028 (outside Multi- Purpose Room 2010) as well as penetrate to atmosphere through the exterior wood fascia of the roof overhang on the BRAVO sector of the school. As the fire above Corridor 2028 (outside Multi- Purpose Room 2010) continued to grow in intensity it also began to seek additional avenues of least resistance and escape by attacking the built-up asphalt roof membrane and the structural wood roof / ceiling framing / joist bridging over the 2 classroom blocks on the BRAVO and CHARLIE sectors of the school. Also, it is the opinion of the undersigned, that the fire at this location was attempting to gain access into the CENTER CORE (Library 2011) sector of the structure by attacking the exposed clear glass glazing of the clerestory windows located along the CHARLIE sector as well as attacking and penetrating into the exposed roof overhang / soffit areas along the BRAVO sector of the structure. (See drawings A/4,A/5,A/8,A/16-A/18 and photograph 55).

In the opinion of the undersigned upon the BRAVO, CHARLIE AND CENTER CORE (Library 2011) sectors of the school structure being engulfed in flames at the roof assemblies, the fire continued to grow in intensity and spread outward in the open roof / ceiling cavity above Corridor 2028 and into Corridor 2028 proper and eventually Corridor 2027. Upon the fire entering Corridor 2027, the fire rapidly spread at the floor and roof / ceiling levels into Classrooms (2018, 2019 and 2020), Learning Assistant Rooms 2017 and 2017A, the ancillary rooms (washrooms / medical room) and center stairway on the upper floor of both the ALPHA and BRAVO sectors of the school structure. Eventually, the upper floor on the front ALPHA sector of the structure became totally engulfed in flames caused by the structural collapse of the structural wood roof / ceiling assembly. This allowed the fire to attack the structural wood floor / ceiling assembly causing it to collapse and allowed the fire to penetrate into the lower floor level of the school where it was able to attack the various rooms and their content. (See drawings A/2,A/10,A/11,A/14 and photographs 1,2,6-10,15 and 16).

Also, at this time, it is the opinion of the undersigned that the fire was actively traveling away from the front ALPHA sector classroom block of the school and heading towards Gymnasium 2024 and its ancillary rooms. Eventually, the fire penetrated through the adjacent walls and door openings from the classroom block into Gymnasium 2024 and its ancillary rooms and began igniting the interior room content. Further, as the fire continued to escalate within Gymnasium 2024 and its ancillary room the fire penetrated through the roof assembly to atmosphere. As the structural roof assembly of Gymnasium 2024 and it's ancillary rooms began to collapse, they fell downward on the structural wood floor of the Gymnasium 2024 and its ancillary room and eventually the fire penetrated downward through the structural wood flooring into the open covered play area beneath. (See drawings A/1,A/2,A/14 and photographs 6-10).

Once the fire had devoured the majority of the ALPHA, BRAVO, CHARLIE and CENTER CORE (Library 2011) sectors of the school structure, the fire continued to travel unimpeded into the roof assembly of the remaining classroom block (Classrooms 2001, 2002, 2003 and 2013) on the DELTA sector of the school structure. The fire rapidly attacked and consumed the structural wood roof / ceiling assembly over the classrooms due to the age of the building materials and the method of construction causing the structural wood roof / ceiling framing members and built-up asphalt roof membrane to begin to collapse under load and thus travel eventually penetrate downward into

the open classrooms below were it began to attack and destroy the different room content of the Classrooms 2001,2002,2003 and 2013. (See drawings A/1,A/2,A/14 and photographs 10-13).

CONCLUSION

Therefore, in the opinion of the undersigned, the following conclusions have been made with regards to this structural school fire:

- **AREA OF ORIGIN**

The AREA OF ORIGIN of this fire was located on the BRAVO sector of the school structure in Multi-Purpose Room 2010.

- **POINT OF ORIGIN**

The POINT OF ORIGIN of this fire could not be determined due to the extent of fire damage caused by the fire and therefore shall remain UNKNOWN / UNDETERMINED at this time.

- **IGNITING OBJECT**

The IGNITING OBJECT of this fire was suspected to be a DIRECT or NAKED FLAME (match or lighter) initiated by the Human Element.

- **FORM OF HEAT OF IGNITION**

The FORM OF HEAT OF IGNITION of this fire was suspected to be CHEMICAL ENERGY (HUMAN ELEMENT oxidization reaction) - the use of a DIRECT or NAKED FLAME (match or lighter) by the Human Element.

- **MATERIAL FIRST IGNITED**

The MATERIAL FIRST IGNITED of this fire was suspected to be ORDINARY COMBUSTIBLES (paper constructed product).

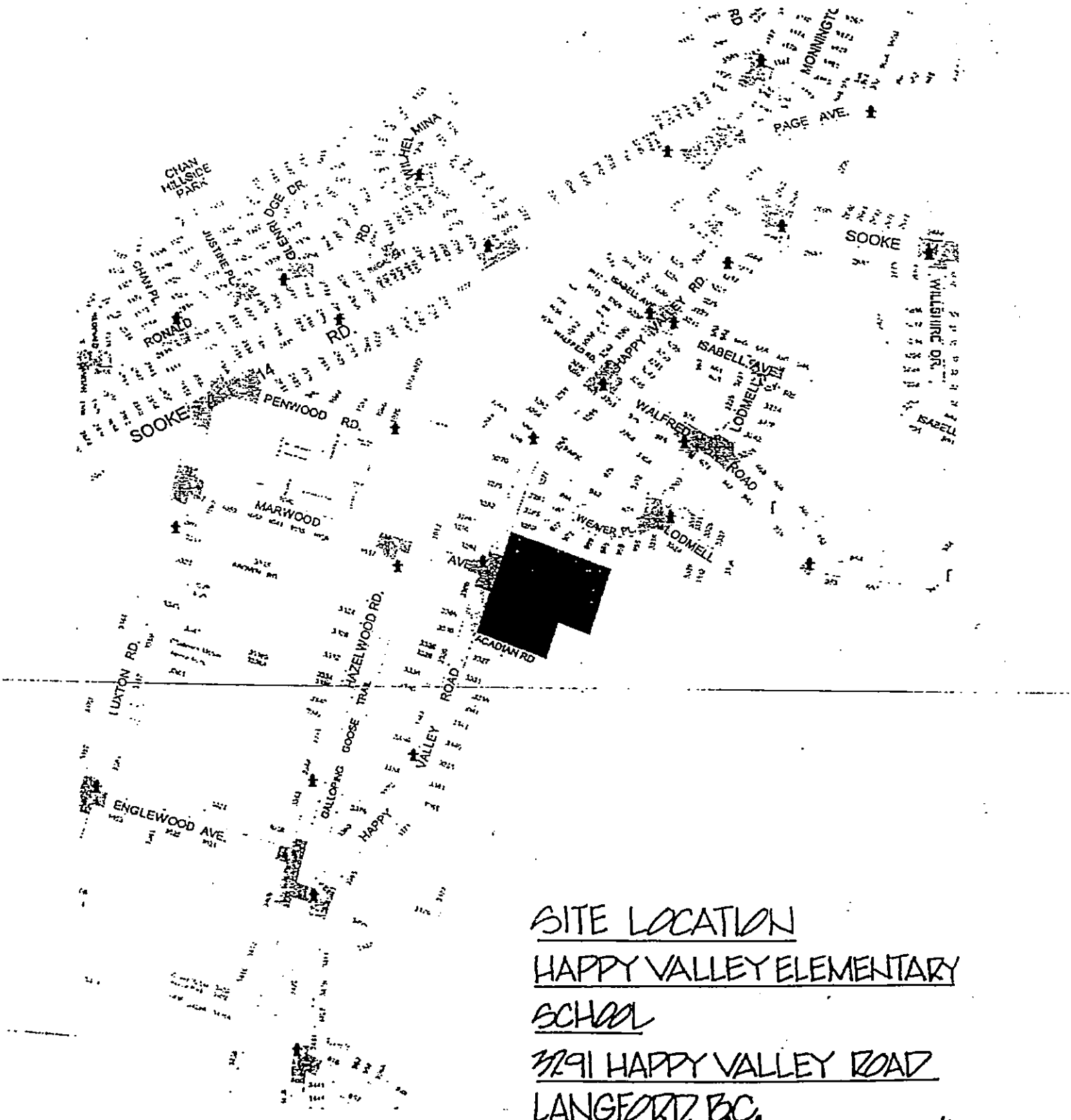
- **ACT OR OMISSION**

THE ACT OR OMISSION of this fire was UNKNOWN / UNDETERMINED but with suspicious overtones.

Respectfully Submitted

Ray Aitken

Ray Aitken
Fire Investigator



SITE LOCATION
HAPPY VALLEY ELEMENTARY SCHOOL
3291 HAPPY VALLEY ROAD
LANGFORD, B.C.

S/I

FLOW CHART - SCHOOL FIRE
HAPPY VALLEY ELEMENTARY
SCHOOL - LANGFORD BC.
HOLDEN EA.

F/1

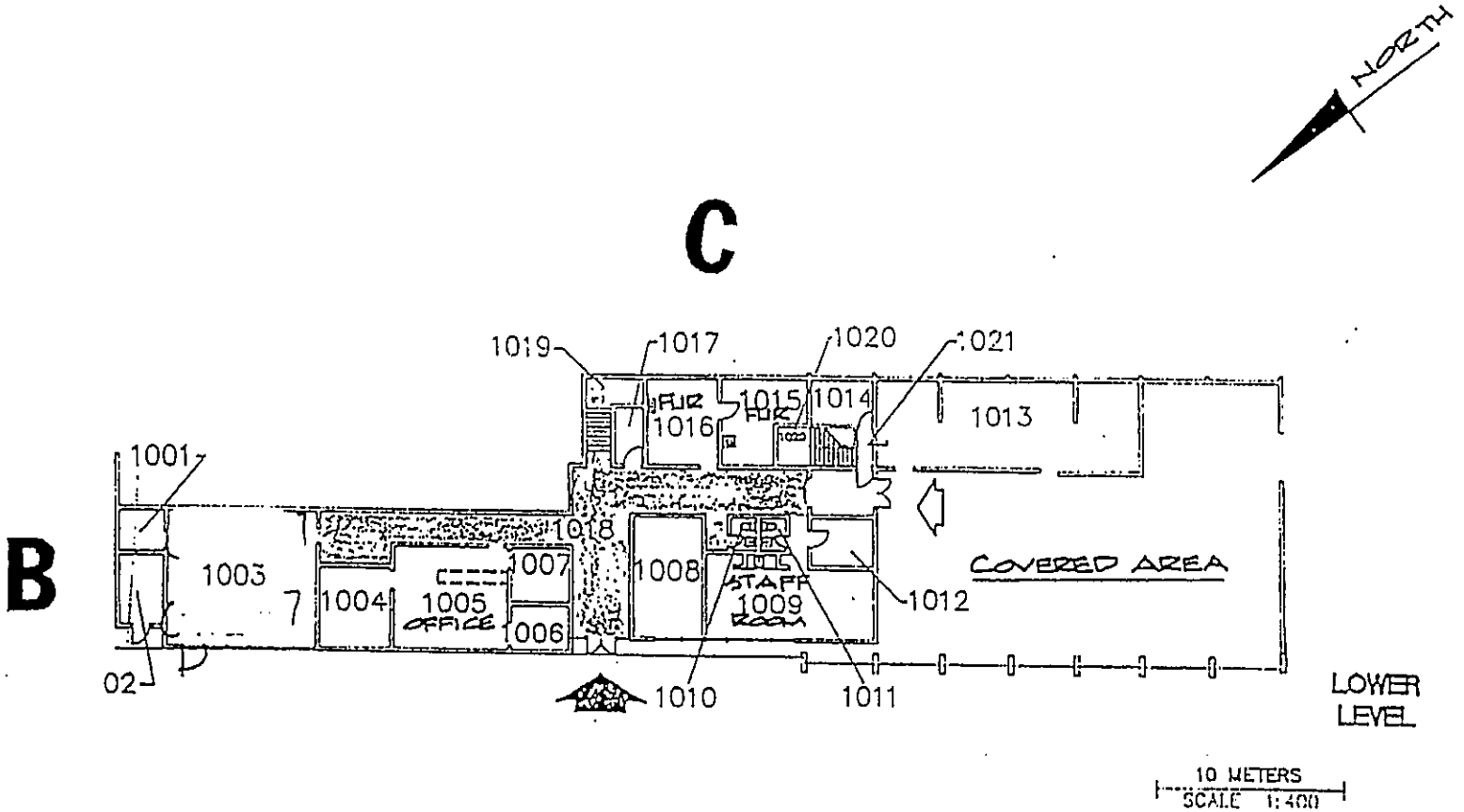
HAPPY VALLEY STAFF
2004/2005 SCHOOL YEAR

STAFF NAME	ASSIGNMENT
[redacted]	Grade 4/5 Teacher – Div. 3
Bob Belcher	Principal
	Supervision Assistant
	Custodian
	Grade 3/4 Teacher / Reading Recovery
	Grade 6 Teacher – Div 1 (T.I.C.)
	Kindergarten Teacher
	Teaching Assitant
	Teaching Assistant
	Supervision Assistant
	Grade 1/2 Teacher
	Teaching Assistant
	K. pm)/Grade 1 Teacher/Div.7 / Library
	Teaching Assistant
	Secretary
	Grade 2/3 Teacher Div. 5
	Teaching Assistant
	Counsellor
	Y.F.C.
	Grade 5/6 Teacher – Div. 2
	Supervision Assistant
	Grade 3/4 Teacher – Div.4 / L.A./L.S.

Teaching Assistant Assignments

Teaching Assistant	Student(s) Assigned	Classroom Teacher

T/1

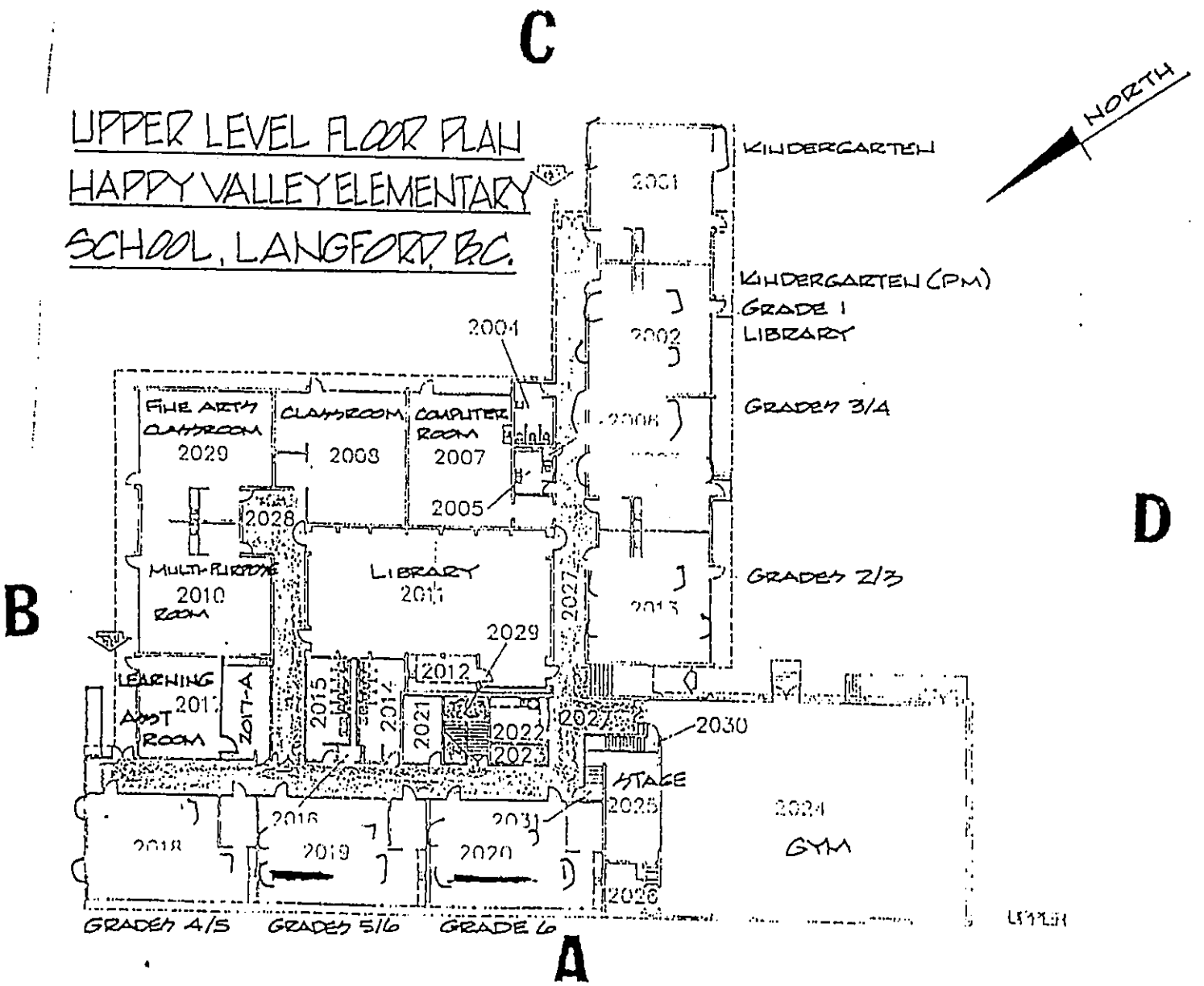


LOWER LEVEL FLOOR PLAN

HAPPY VALLEY ELEMENTARY SCHOOL

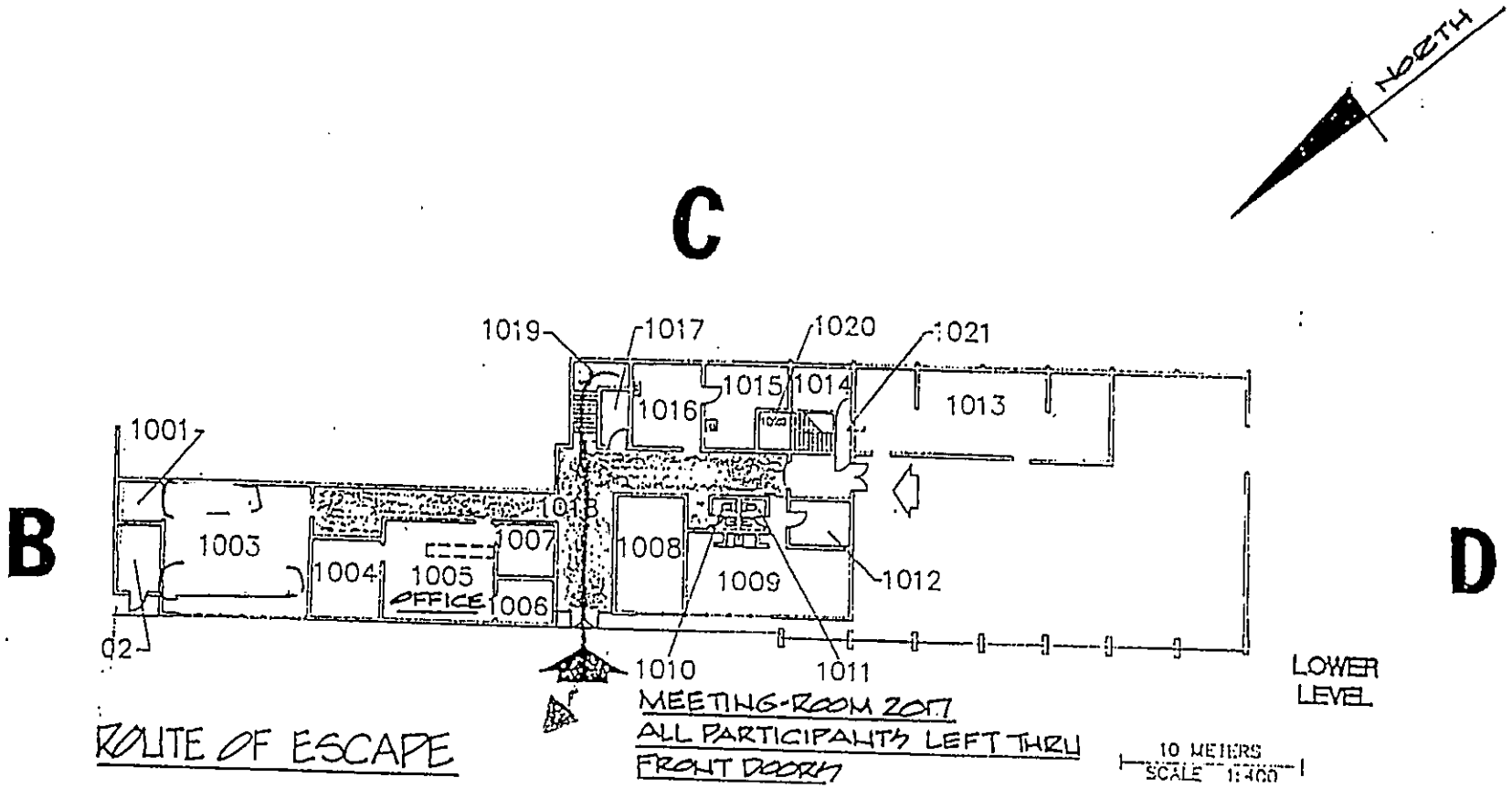
LANGFORD, B.C.

A/1



FIRE CAUSE / DETERMINATION REPORT

A12

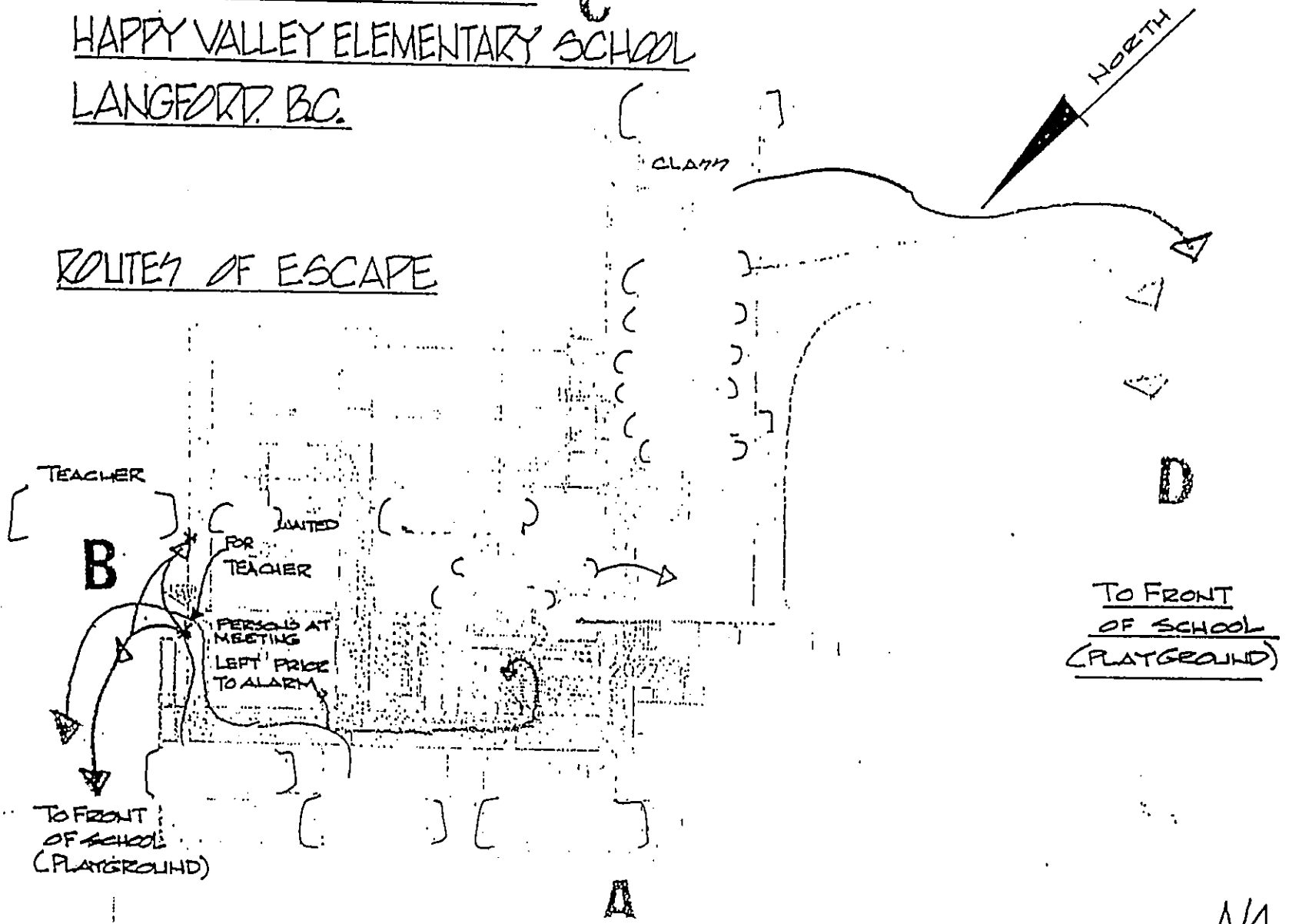


LOWER LEVEL - FLOOR PLAN
HAPPY VALLEY ELEMENTARY SCHOOL
LANGFORD, B.C.

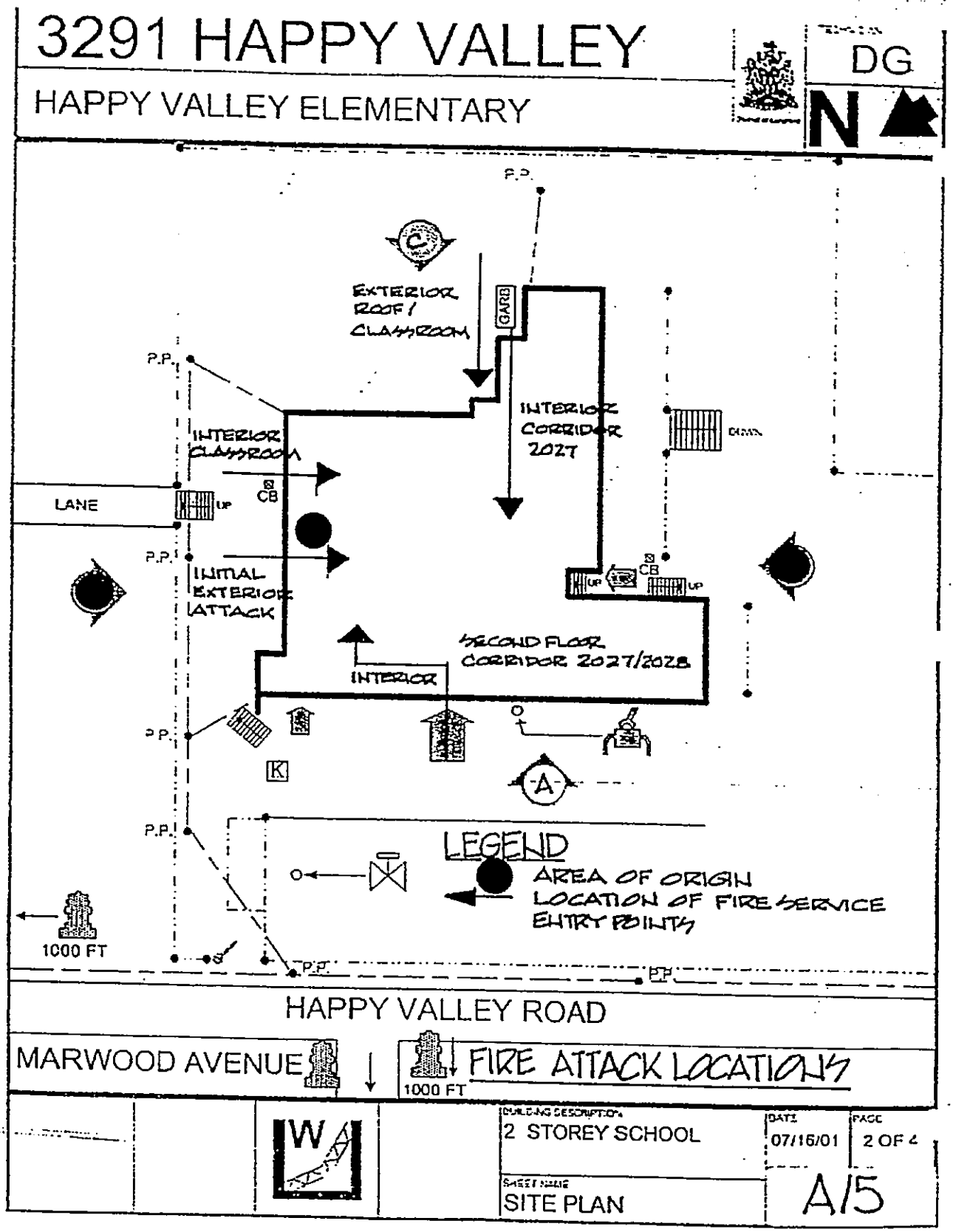
A13

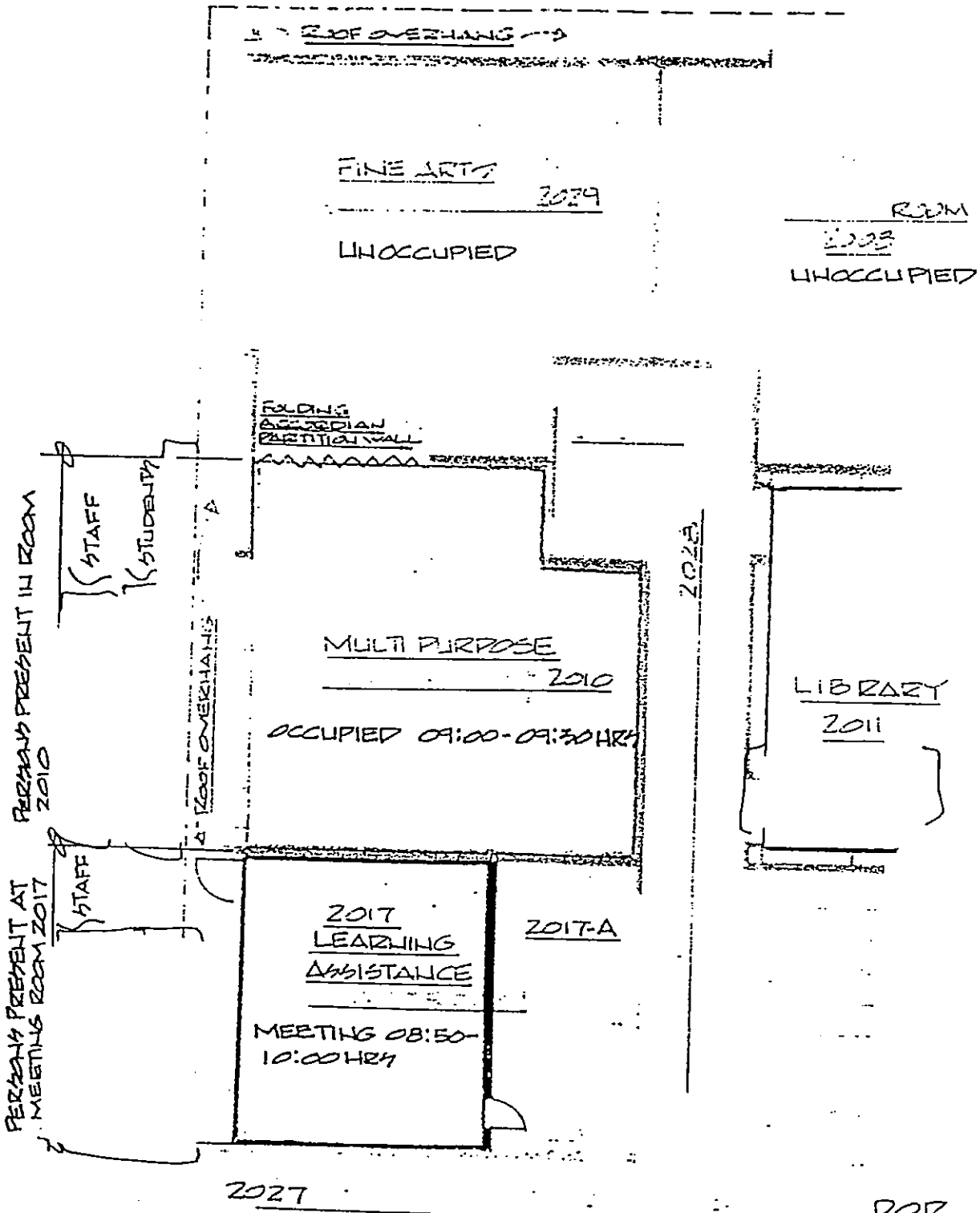
UPPER LEVEL - FLOOR PLAN
HAPPY VALLEY ELEMENTARY SCHOOL
LANGFORD B.C.

ROUTES OF ESCAPE



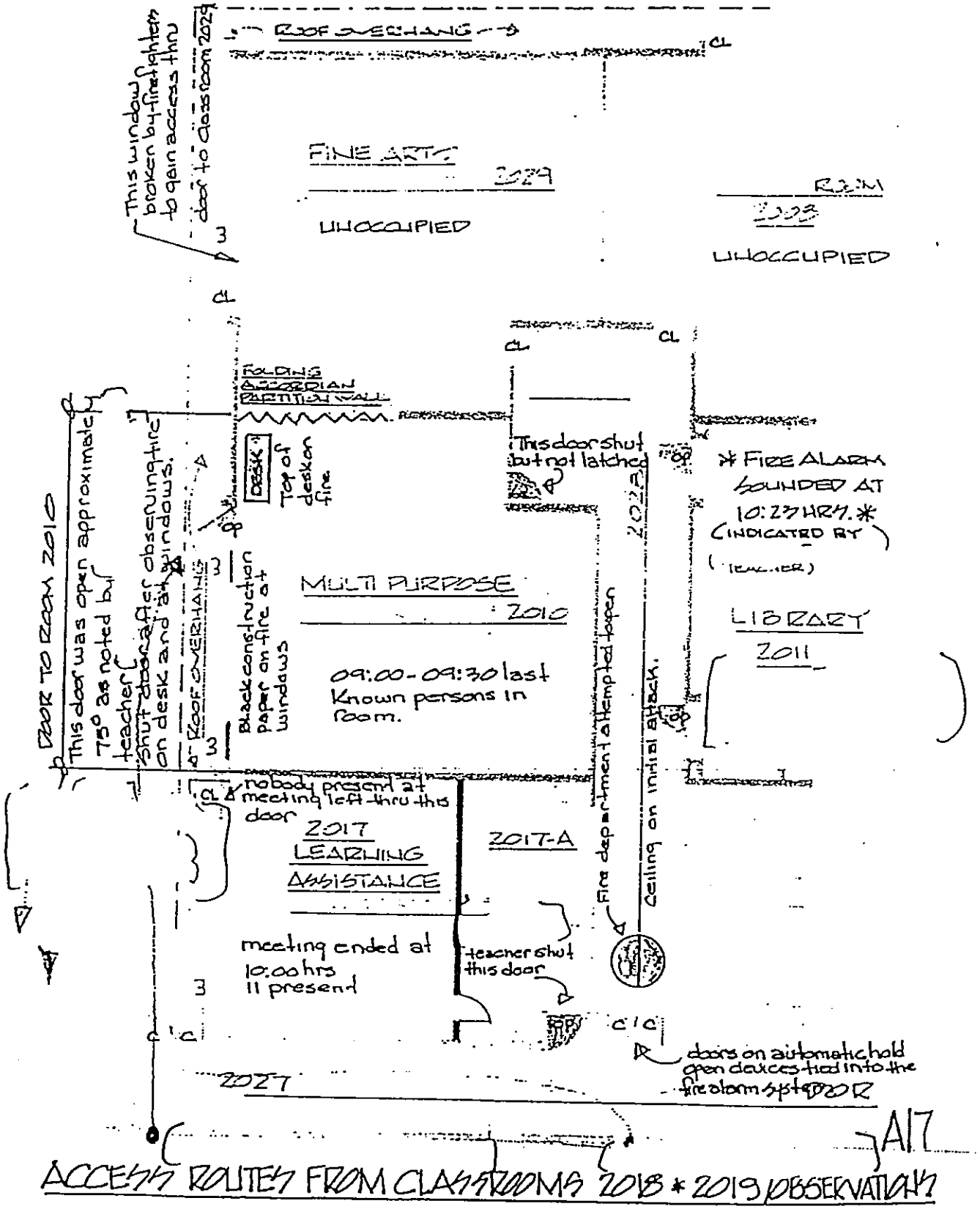
A/4

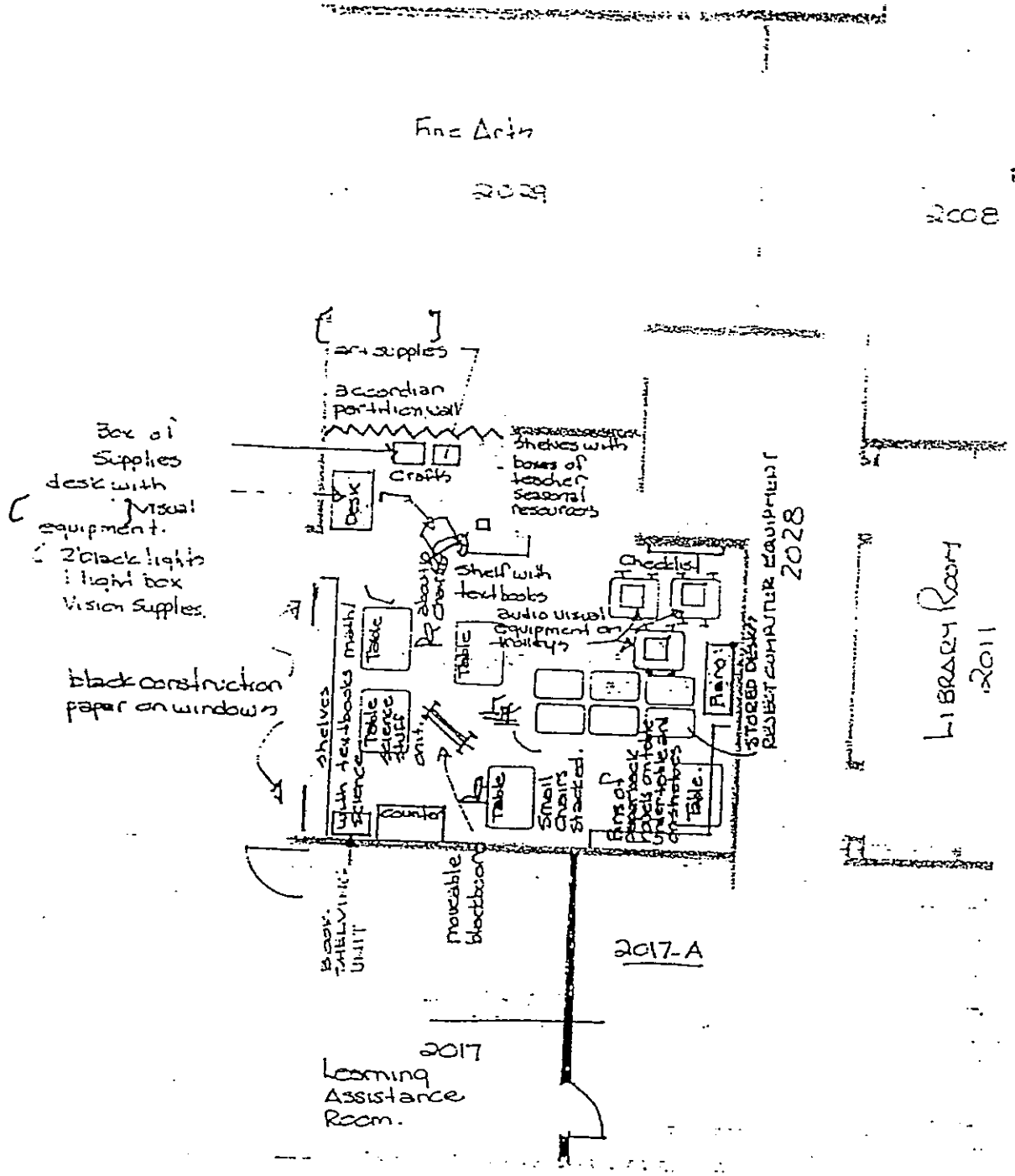

3291 HAPPY VALLEY
HAPPY VALLEY ELEMENTARY
DG
N
P.P.
C
EXTERIOR ROOF / CLASSROOM
GARB
INTERIOR CORRIDOR 2027
INTERIOR CLASSROOM
LANE
CB
UP
INITIAL EXTERIOR ATTACK
SECOND FLOOR CORRIDOR 2027/2028
INTERIOR
K
A
LEGEND
AREA OF ORIGIN
LOCATION OF FIRE SERVICE ENTRY POINTS
1000 FT
HAPPY VALLEY ROAD
MARWOOD AVENUE
1000 FT
FIRE ATTACK LOCATIONS
W
BUILDING DESCRIPTION
2 STOREY SCHOOL
DATE
07/16/01
PAGE
2 OF 4
SHEET NAME
SITE PLAN
A/5



A16

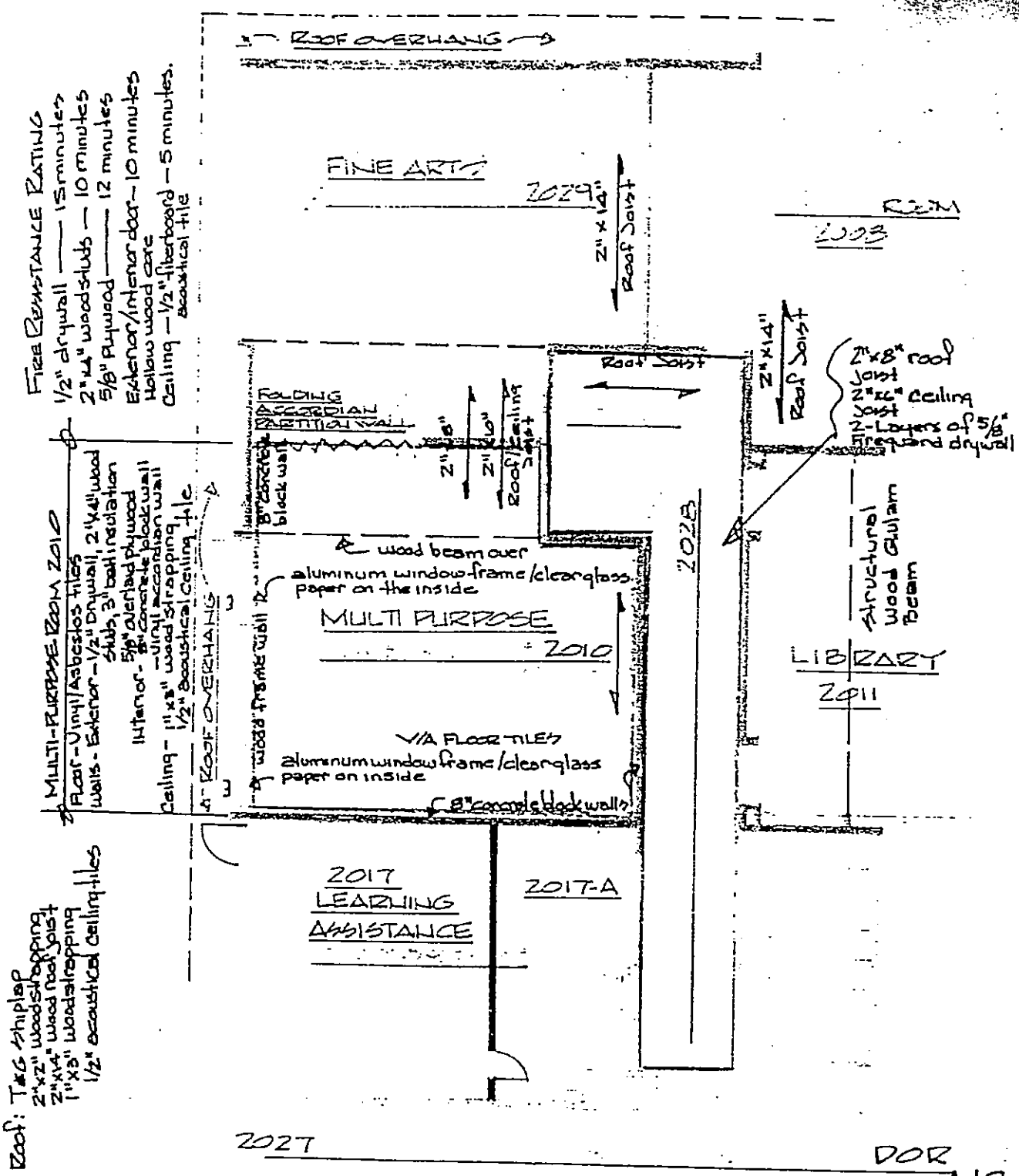
OCCUPANTS MEETING ROOM 2017 & MULTI-PURPOSE ROOM 2010


ROOF OVERHANG
This window broken by students to gain access thru door to classroom 2029
FINE ARTS
2029
UNOCCUPIED
ROOM
2023
UNOCCUPIED
CL
FOLDING ACCORDIAN PARTITION WALL
DESK
Top of desk on fire
This door was open approximately 75° as noted by teacher
shut door after observing fire on desk and all windows.
DOOR TO ROOM 2010
ROOF OVERHANG
Black construction paper on fire at windows
MULTI PURPOSE
2010
09:00-09:30 last Known persons in room.
This door shut but not latched
2022
* FIRE ALARM SOUNDED AT 10:27 HRS. * INDICATED BY (TEACHER)
LIBRARY
2011
nobody present at meeting left thru this door
2017
LEARNING ASSISTANCE
2017-A
Fire department attempted to open
Ceiling on initial attack.
meeting ended at 10:00 hrs
11 present
teacher shut this door
doors on automatic hold open devices tied into the fire alarm system
2027
A17
ACCESS ROUTES FROM CLASSROOMS 2018 * 2019 OBSERVATION



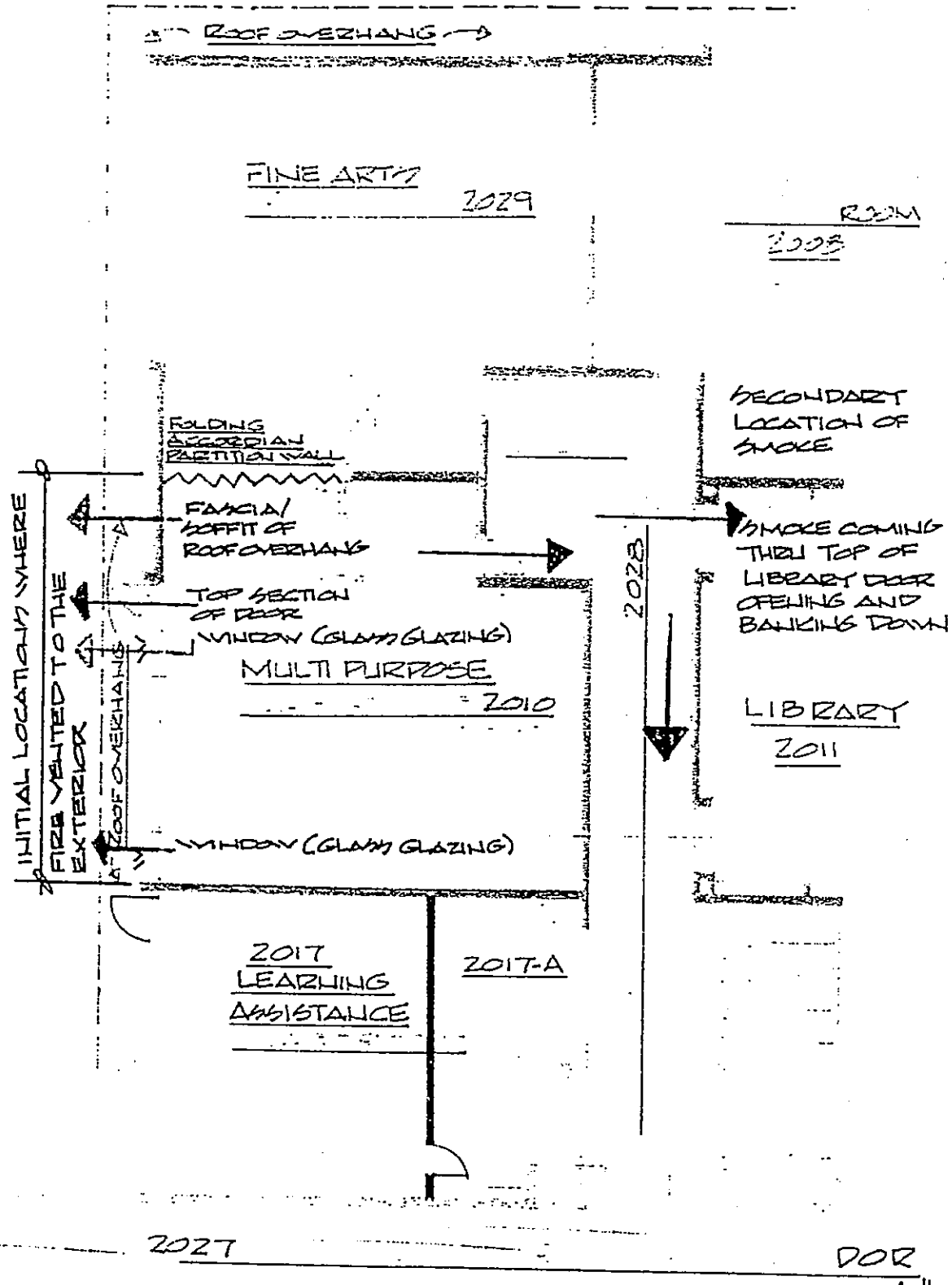
MULTI PURPOSE ROOM 2010 - CONTENT LAYOUT

A18



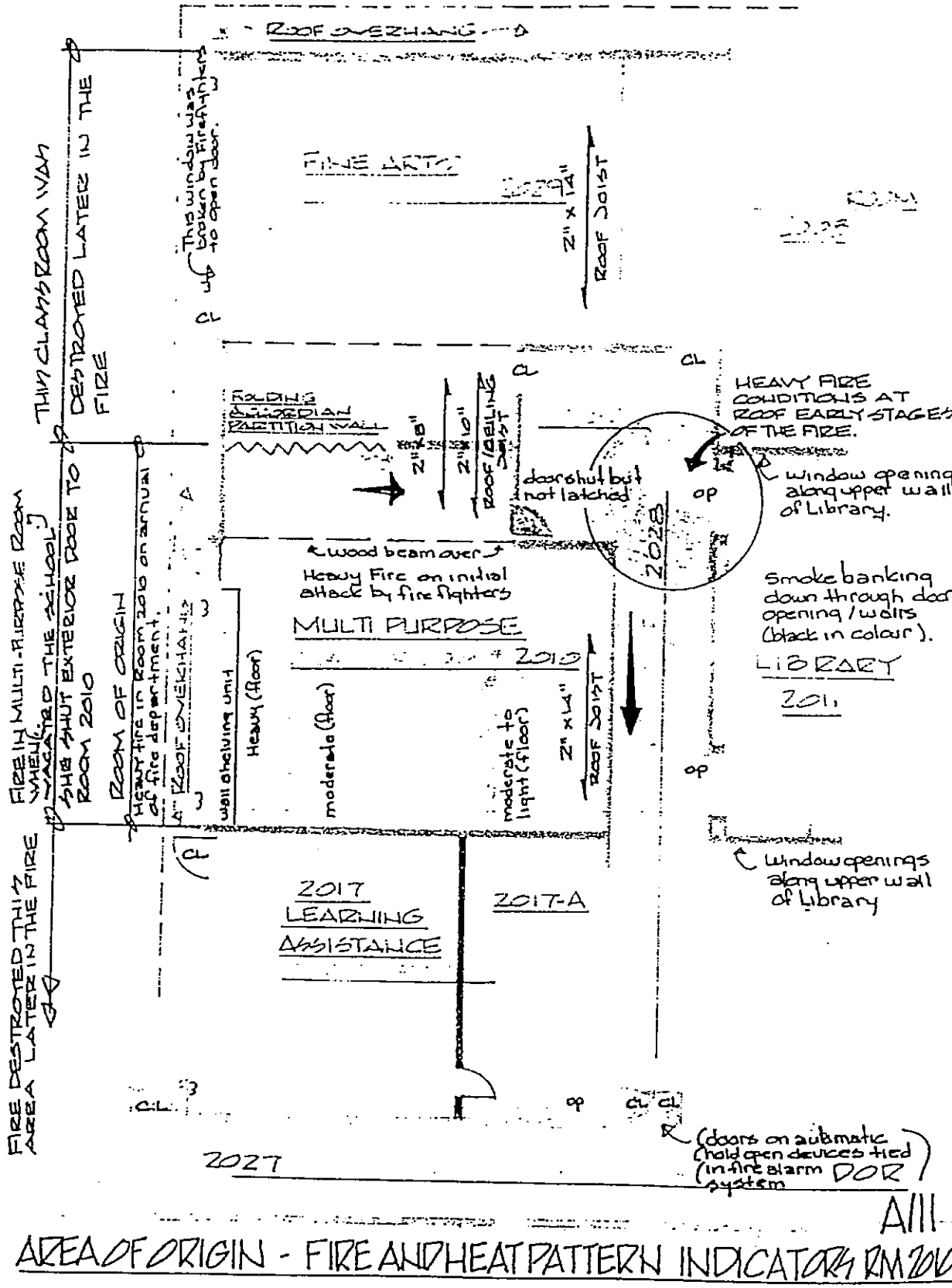
A19

CONSTRUCTION MATERIALS/FIRE RESISTANCE RATINGS - ROOM 2010



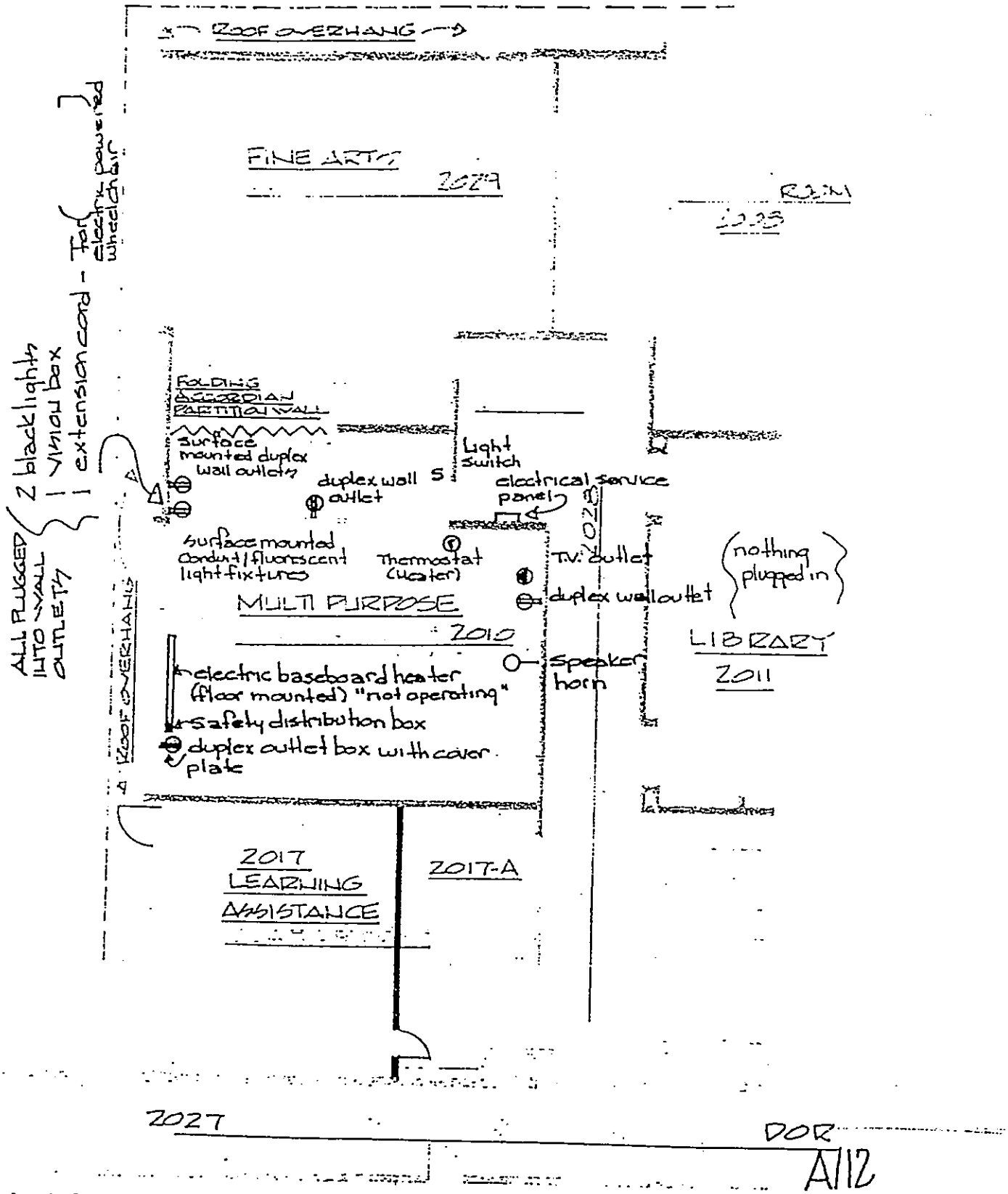
A110

AREA OF ORIGIN - SHOWING LOCATION OF FIRE, HEAT & SMOKE VENTILATION POINTS



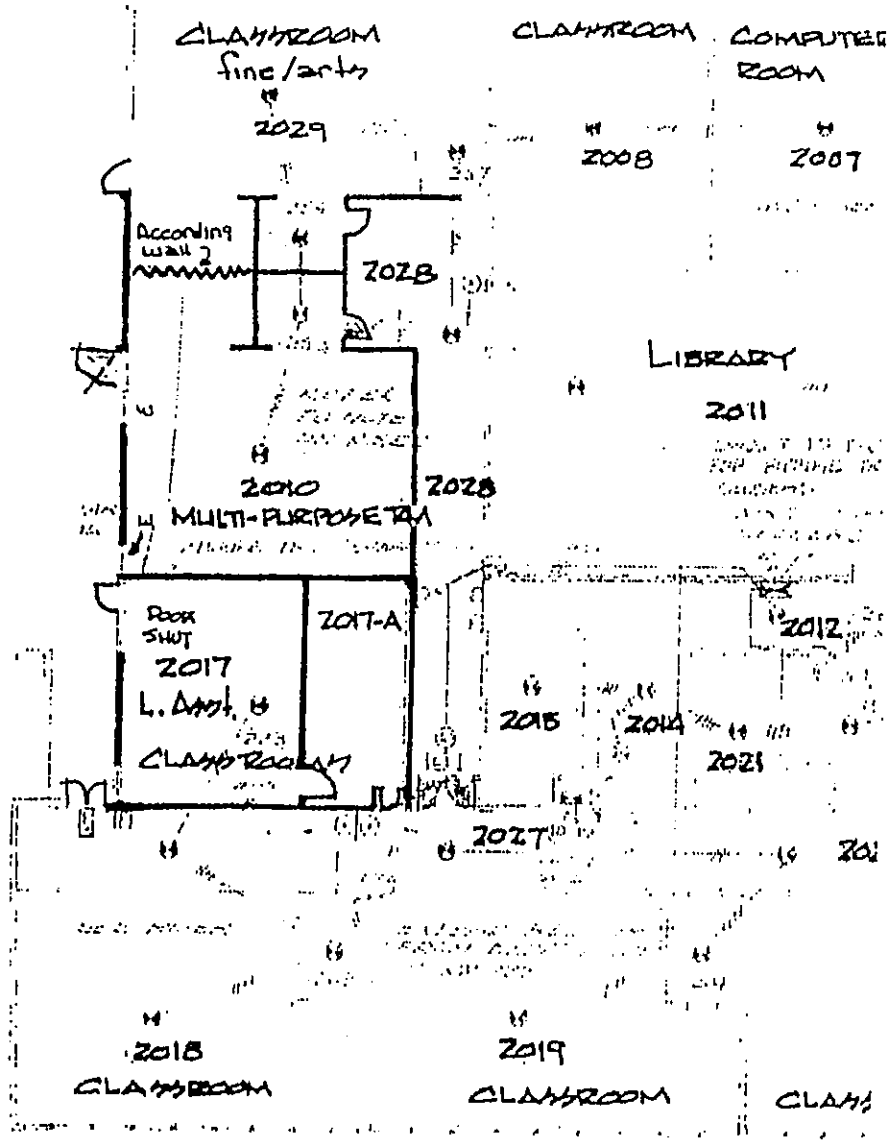
A111

AREA OF ORIGIN - FIRE AND HEAT PATTERN INDICATORS RM 2010



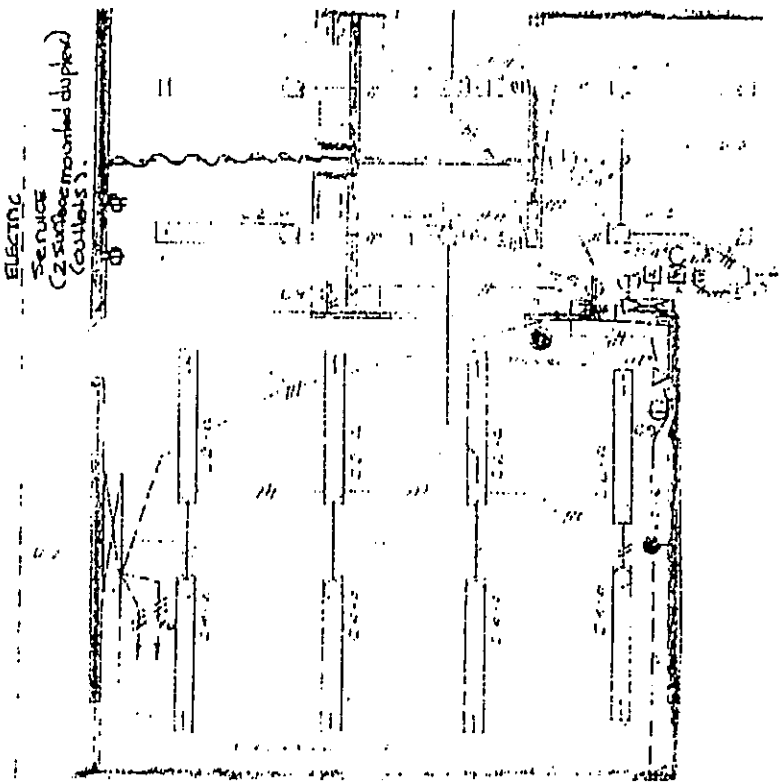
A112

LOCATION OF ELECTRICAL APPLIANCE (HEATER)/OUTLETS



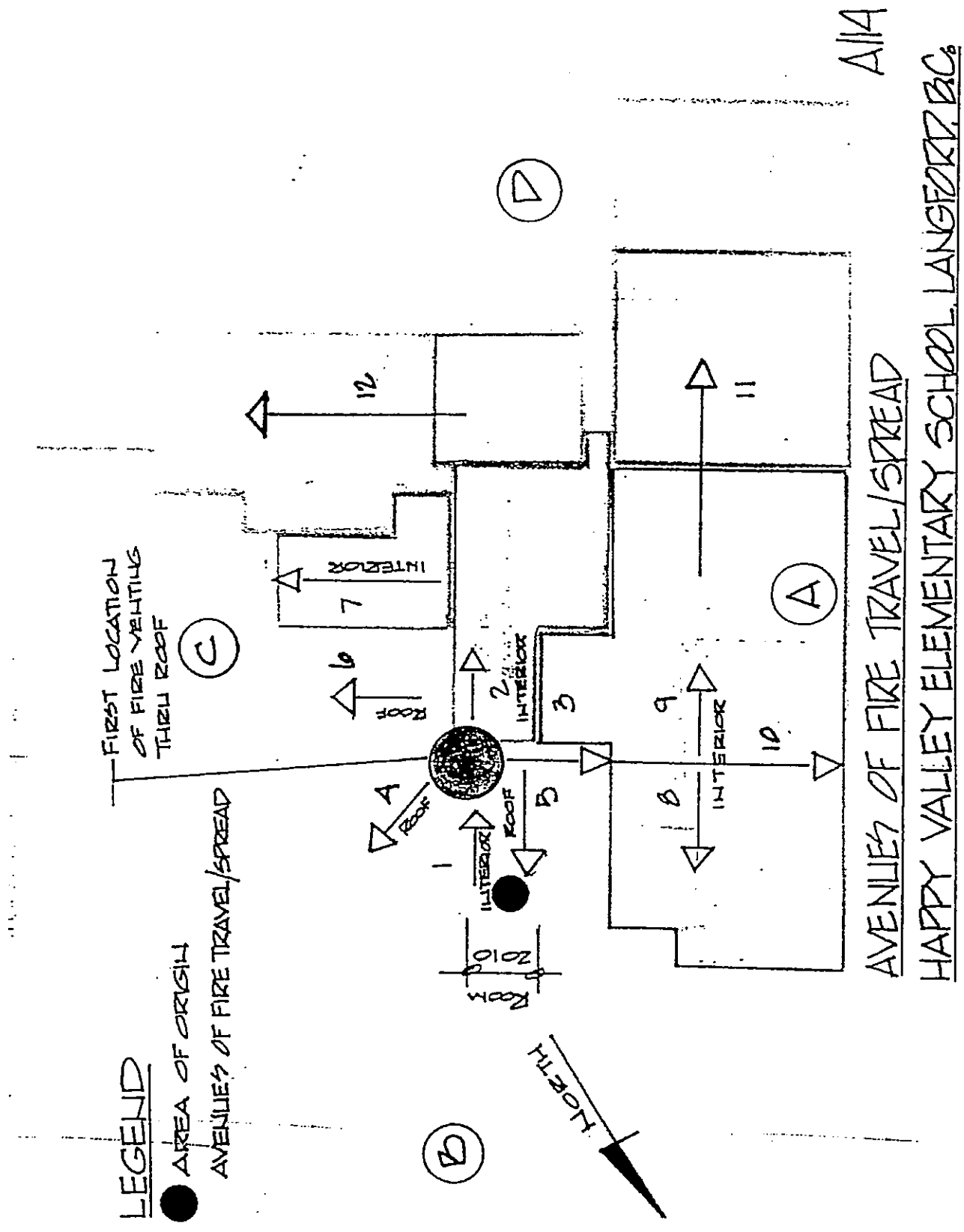
HEAT DETECTOR LOCATIONS- ROOM 2010

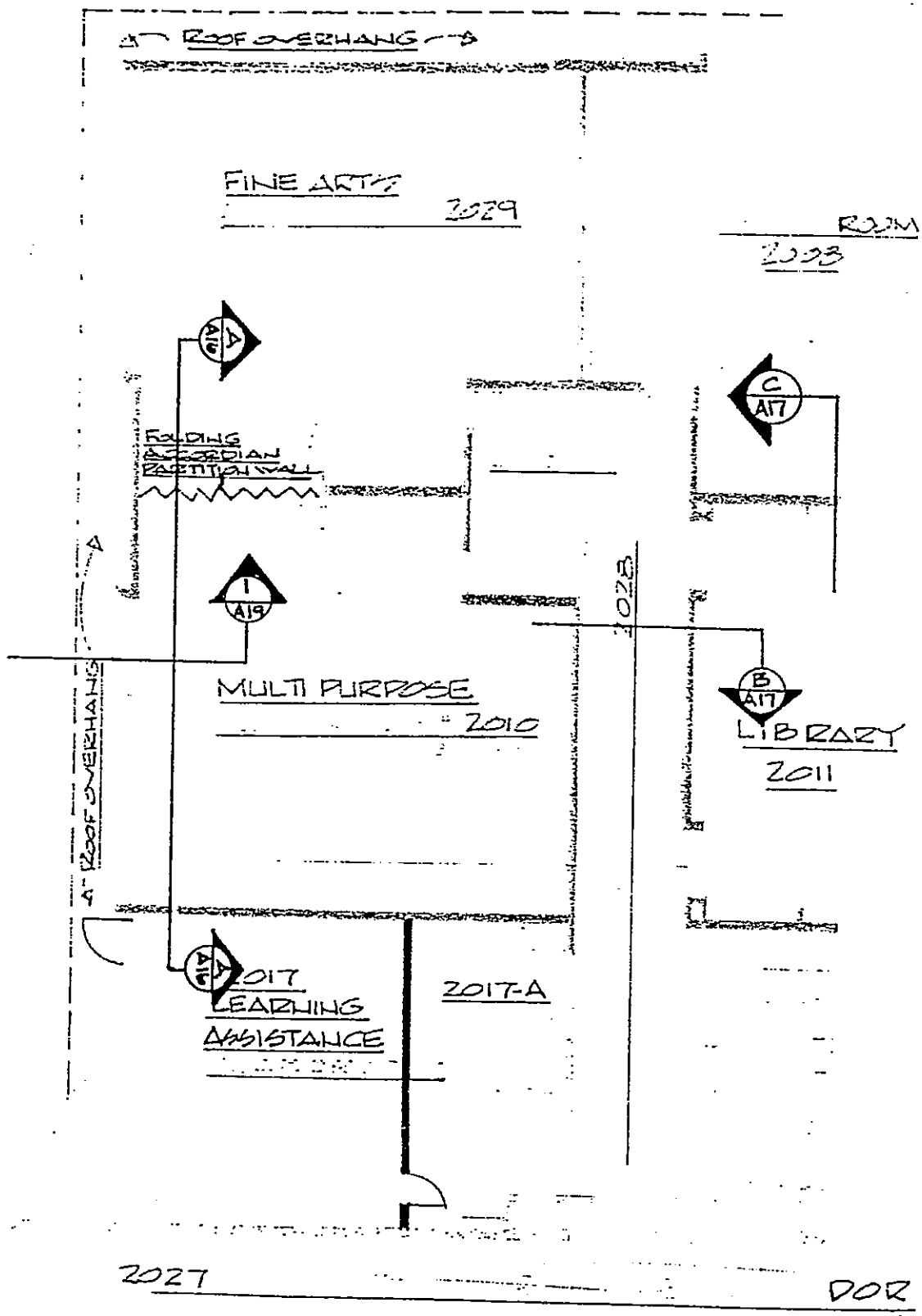
LIGHTING PLAN- ROOM 2010



HEAT DETECTOR/LIGHTING PLAN
HAPPY VALLEY ELEMENTARY
SCHOOL, LANGFORD, B.C.

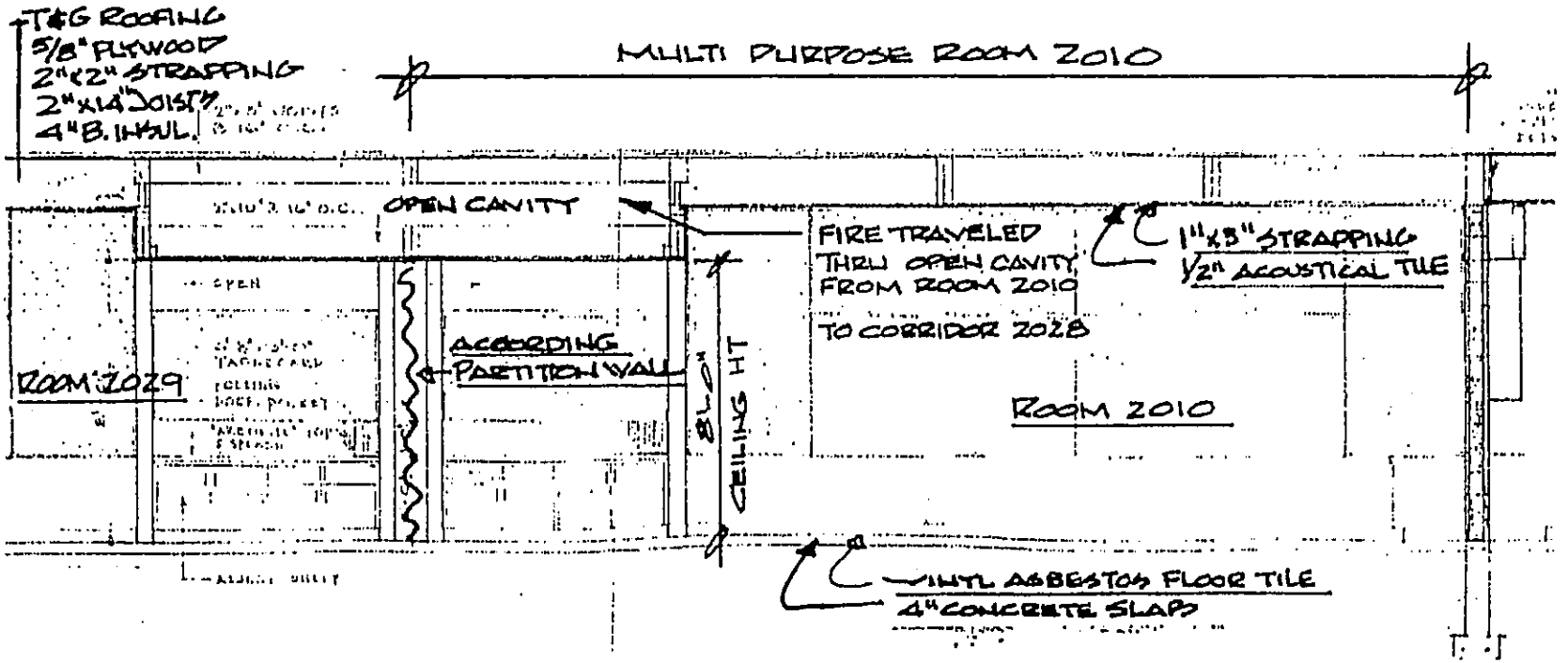
A13


A114
HAPPY VALLEY ELEMENTARY SCHOOL LANGFORD, B.C.
AVENUES OF FIRE TRAVEL/SPREAD
FIRST LOCATION OF FIRE VENTING THRU ROOF
INTERIOR
ROOF
NORTH
LEGEND
AREA OF ORIGIN
AVENUES OF FIRE TRAVEL/SPREAD



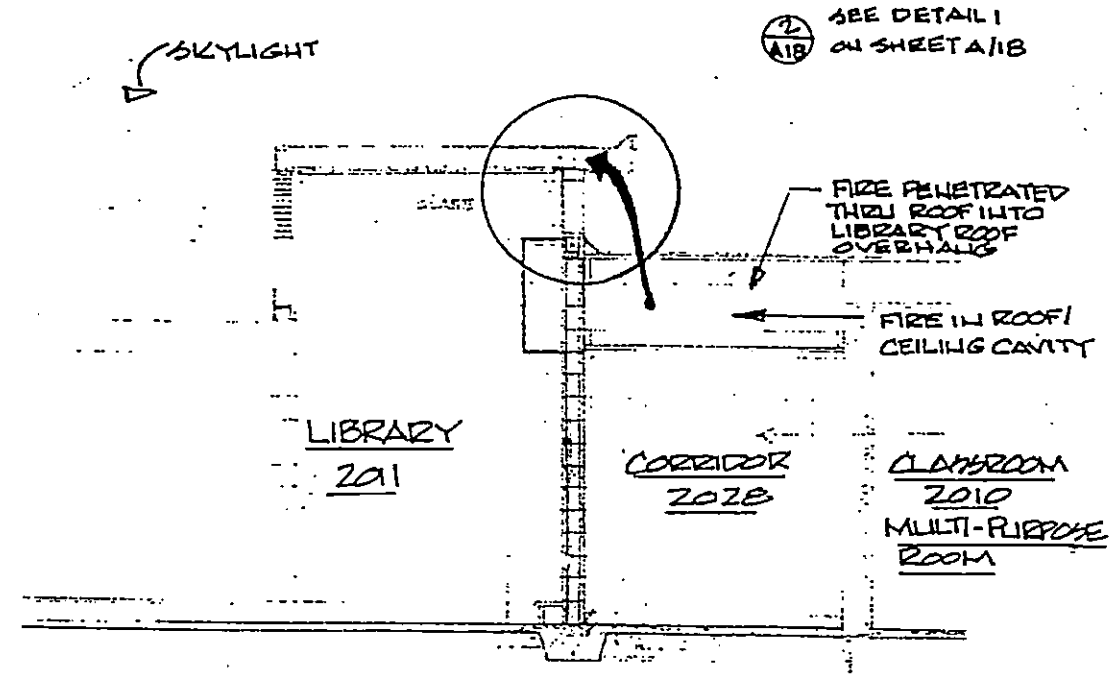
A/15

SECTIONS SHOWING AVENUES OF FIRE TRAVEL

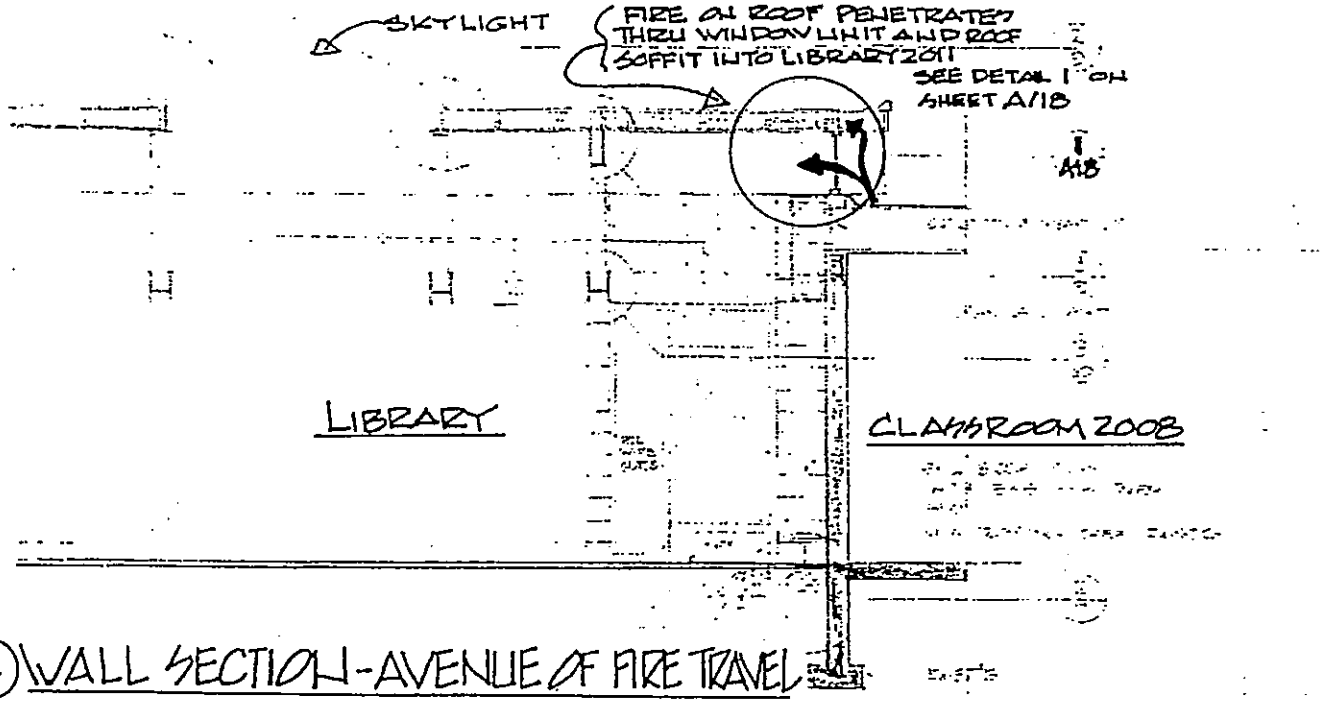


Ⓐ SECTION - MULTI-PURPOSE ROOM 2010

A116

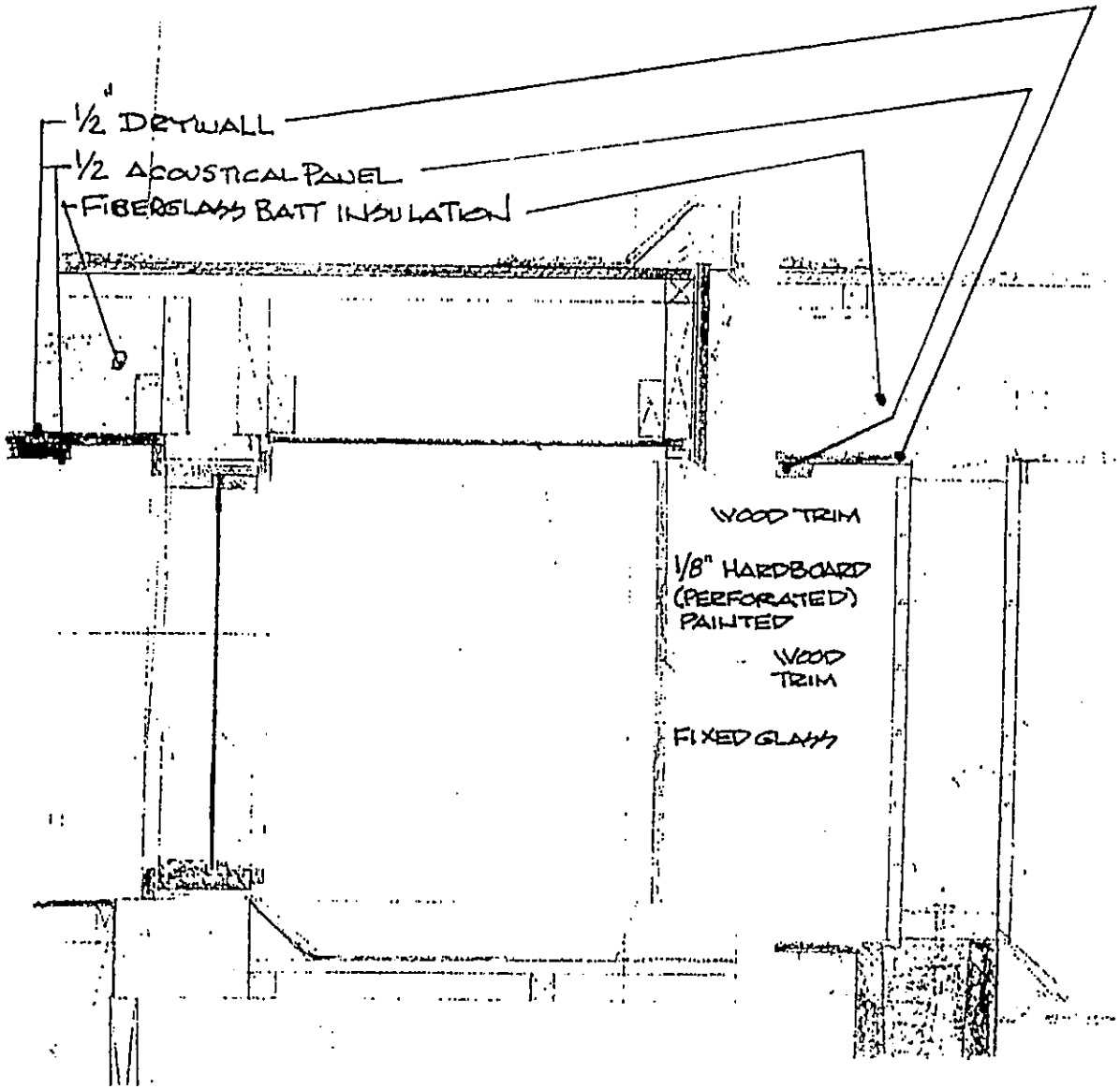


(B) WALL SECTION - AVENUE OF FIRE TRAVEL



(C) WALL SECTION - AVENUE OF FIRE TRAVEL

A/17

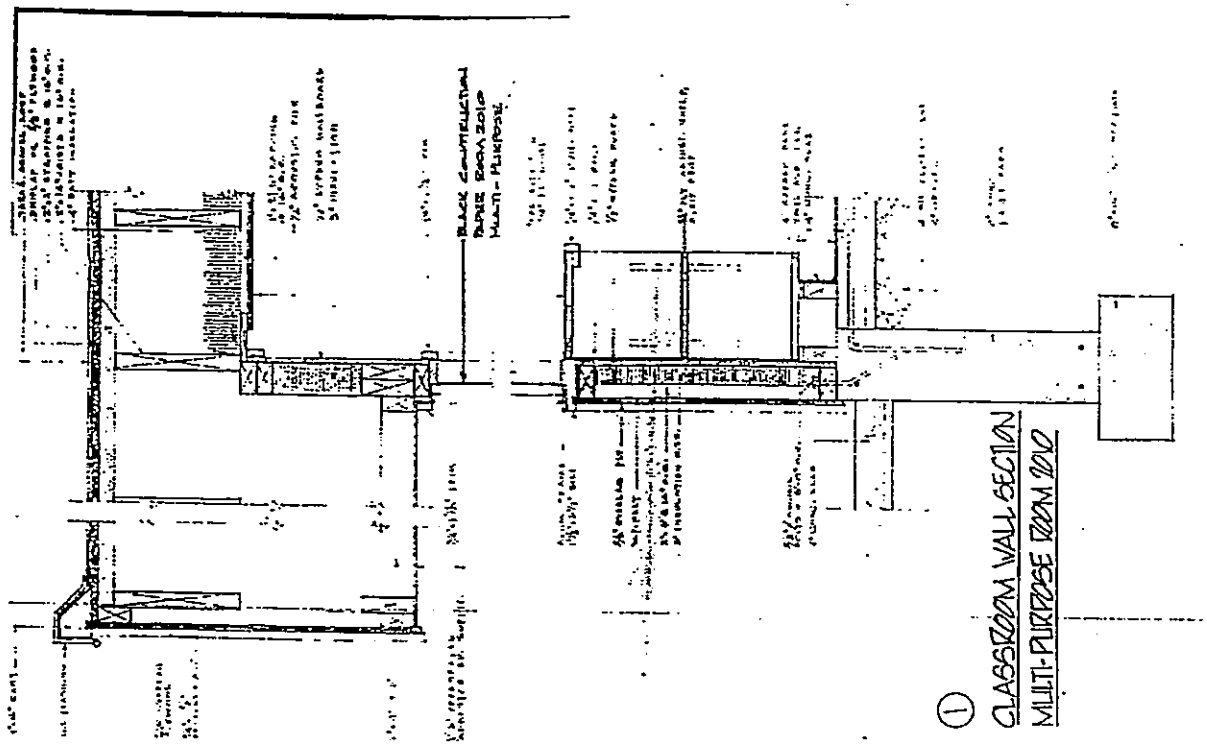


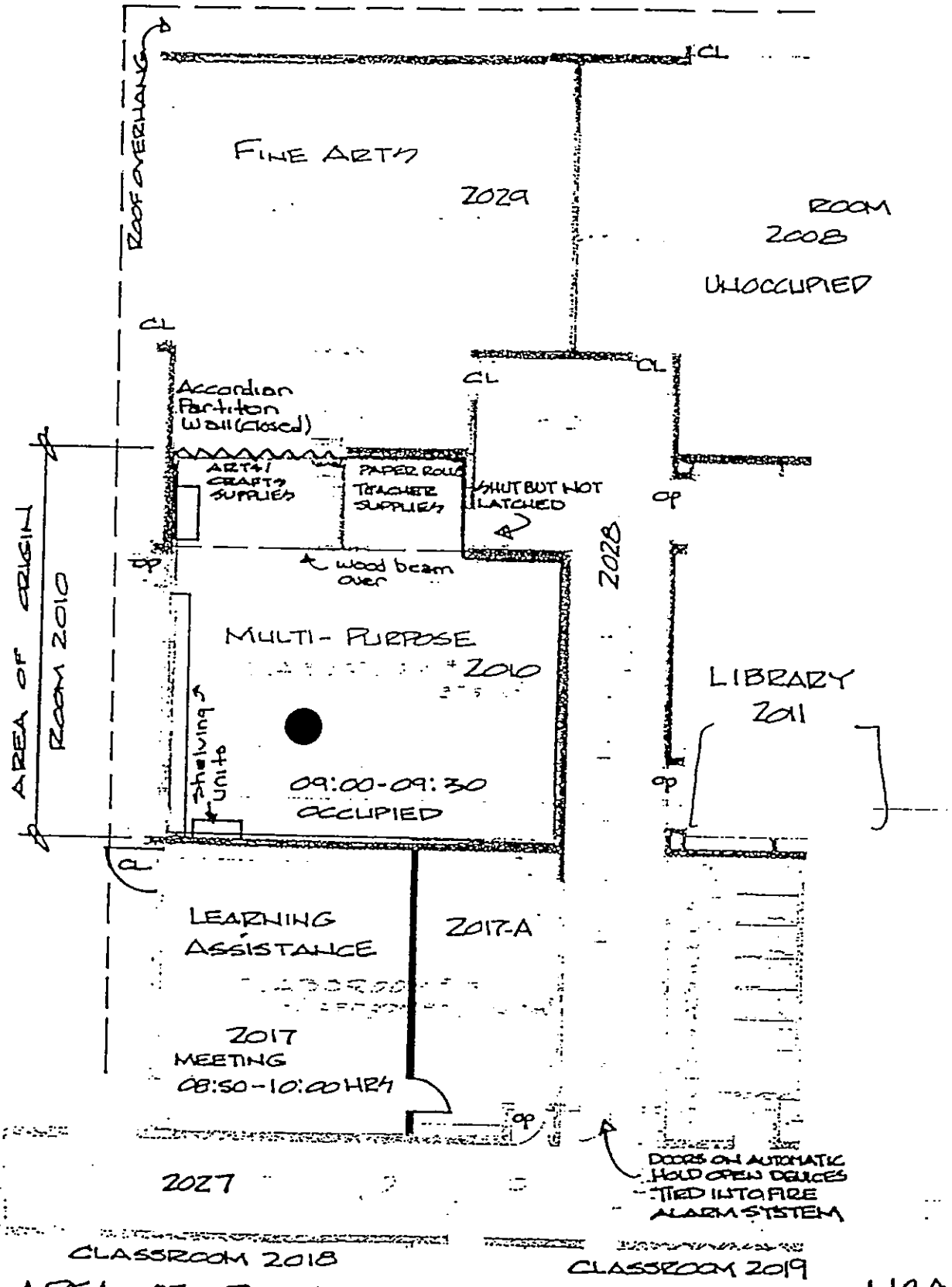
A118

WINDOW DETAIL - LIBRARY 2011 ①

WALL DETAIL - LIBRARY 2011 ②

A119





AREA OF ORIGIN - MULTI-PURPOSE ROOM 2010 A/20

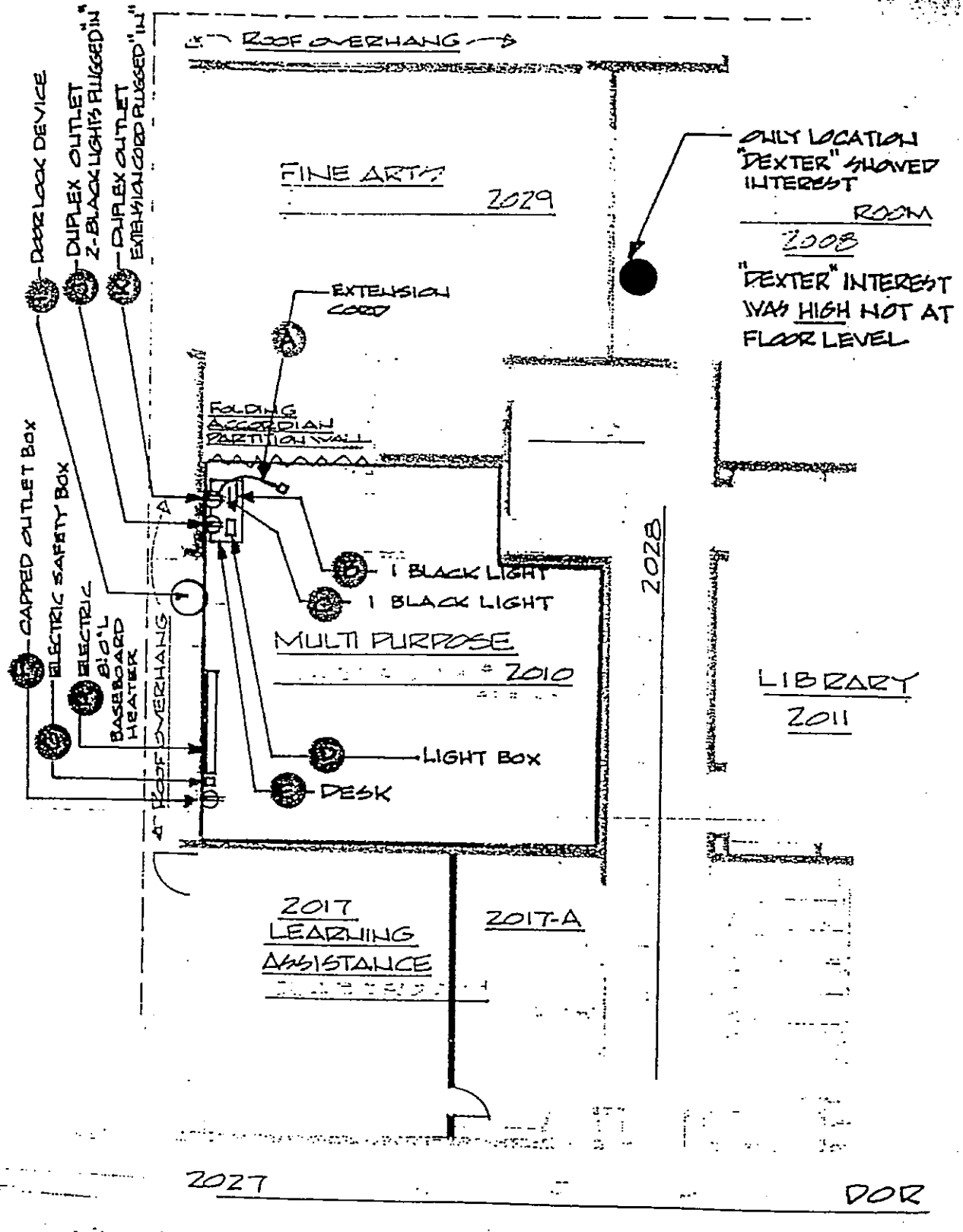
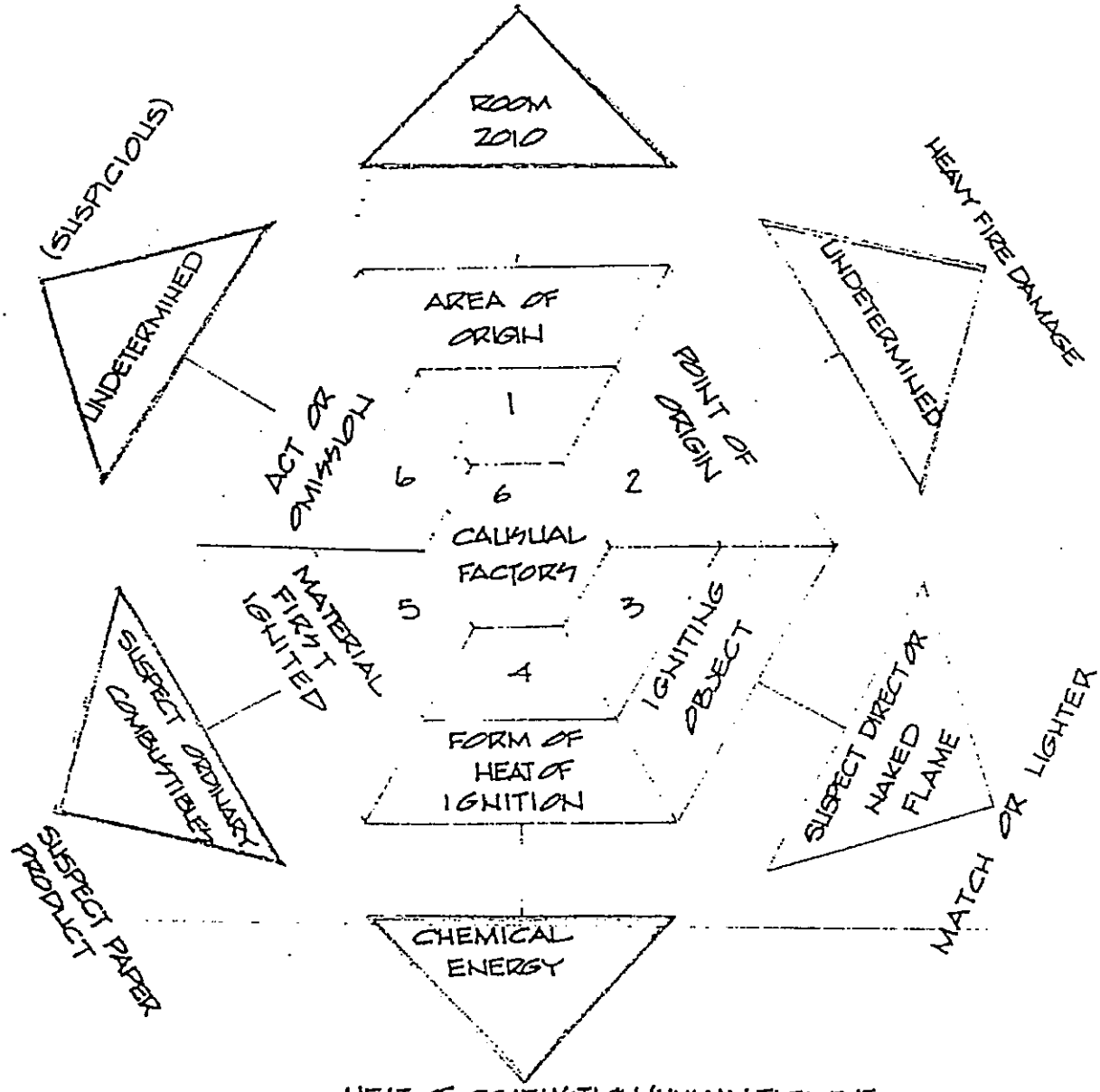


EXHIBIT LOCATIONS - AREA OF ORIGIN ROOM 2010 A121



SIX CAUSUAL FACTORS

HAPPY VALLEY ELEMENTARY SCHOOL FIRE, LANGFORD, B.C.

Figure 1 - Bravo Sector showing extend of fire damage

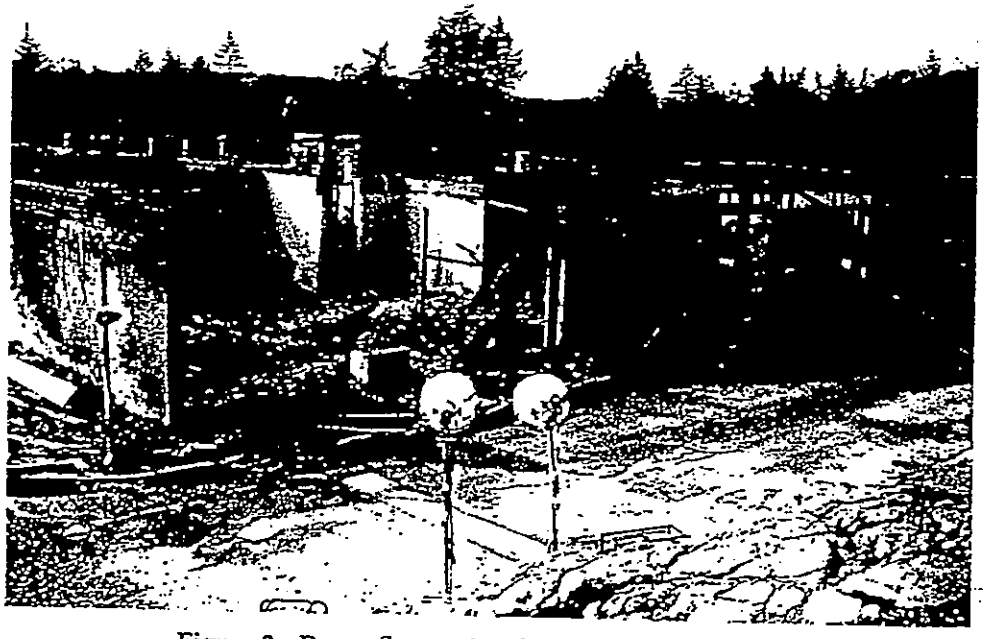


Figure 2 - Bravo Sector showing extent of fire damage

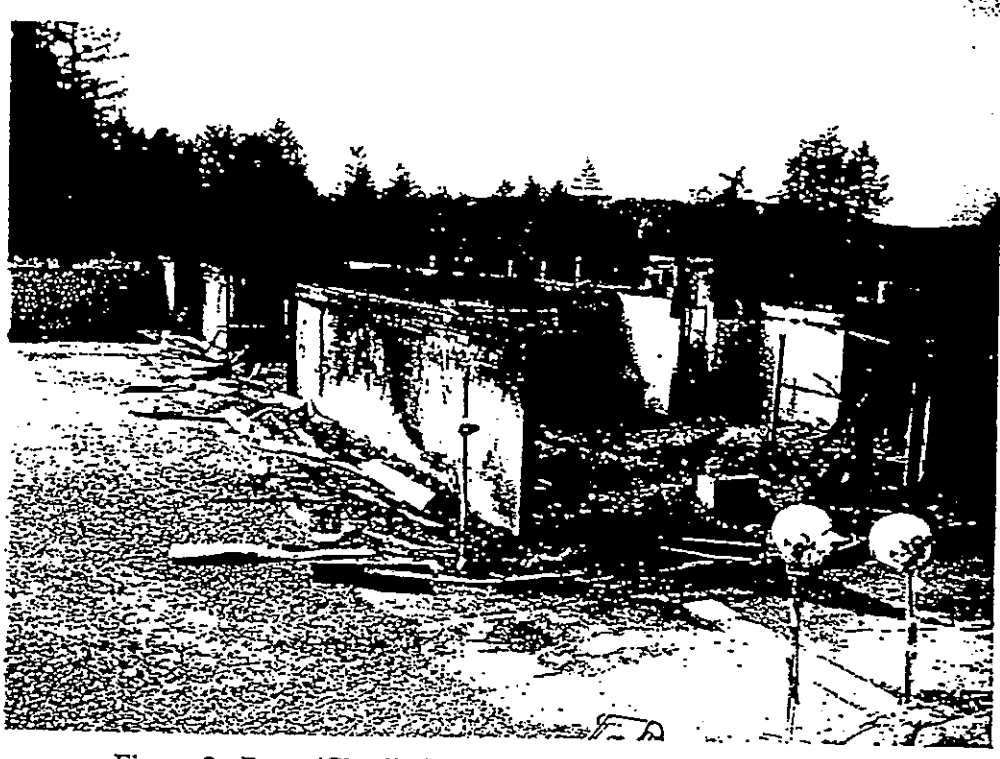


Figure 3 - Bravo/Charlie Sectors showing extend of fire damage

Figure 4 - Charlie Sector showing extent of fire damage

Figure 5 - Charlie Sector showing extent of fire damage

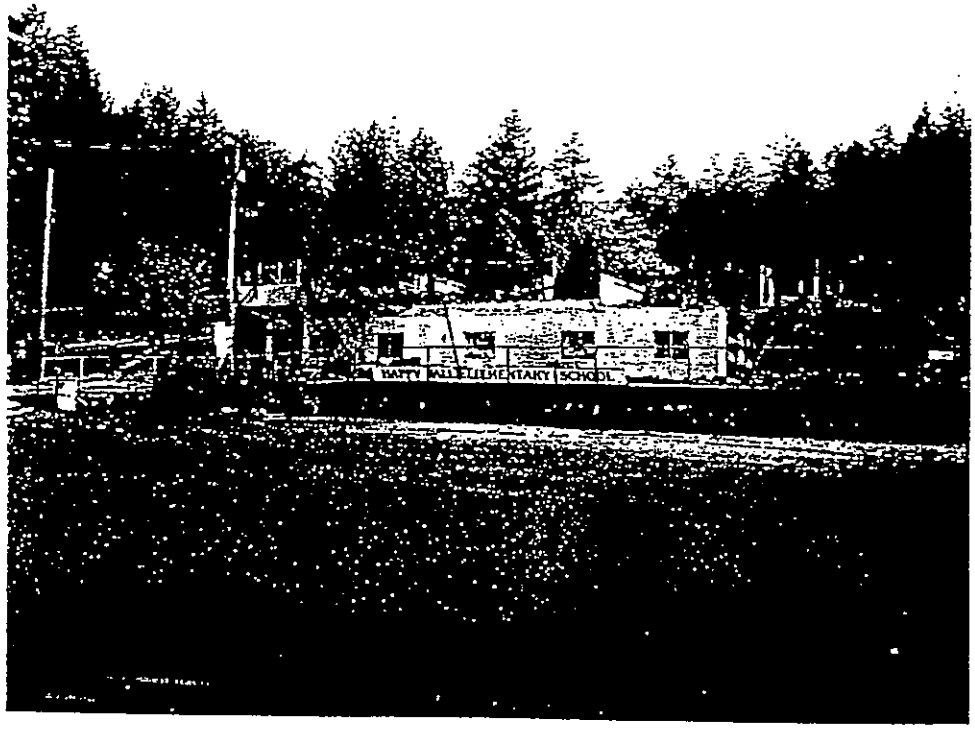


Figure 6 - Alpha Sector showing extent of fire damage

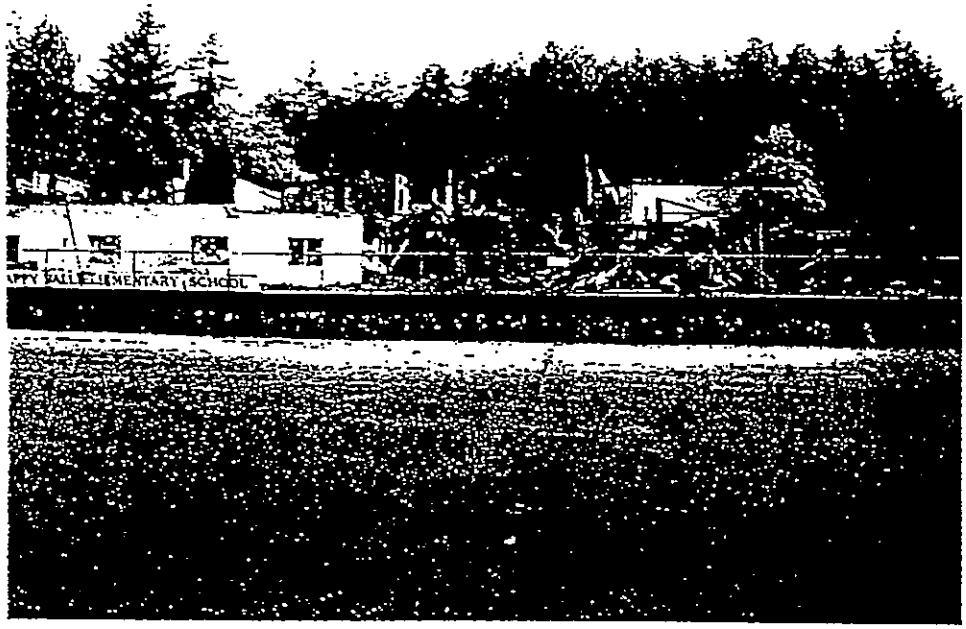


Figure 7 - Alpha Sector showing extent of fire damage

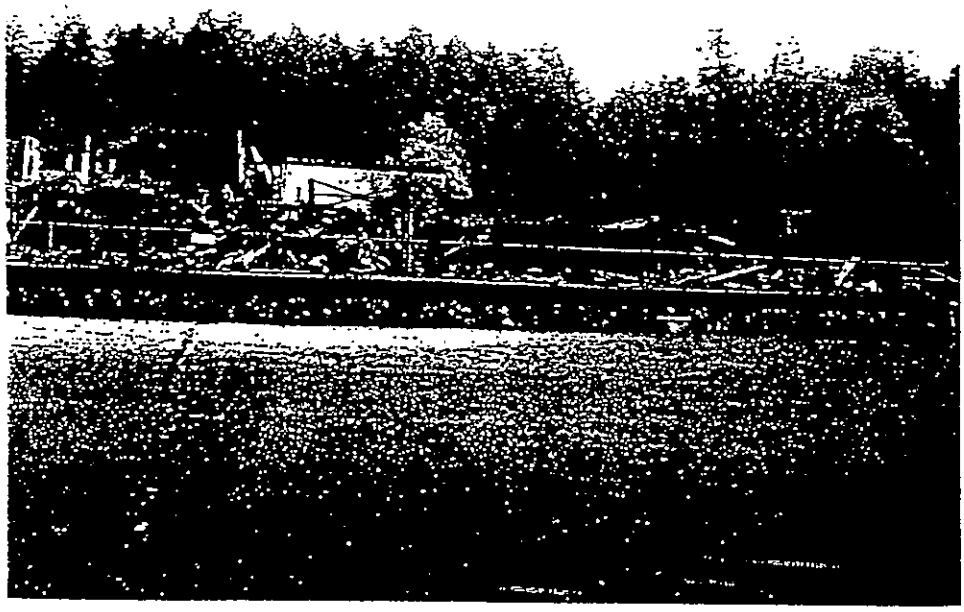


Figure 8 - Alpha Sector showing extent of fire damage

Figure 9 - Alpha Sector showing extent of fire damage

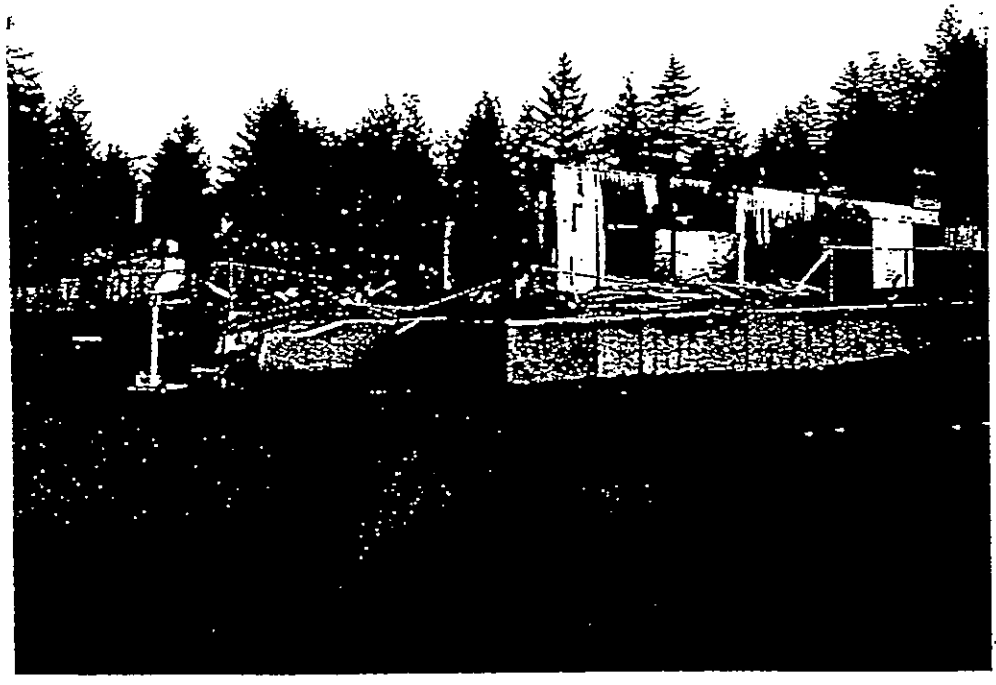


Figure 10 - Alpha/Delta Sector showing extent of fire damage

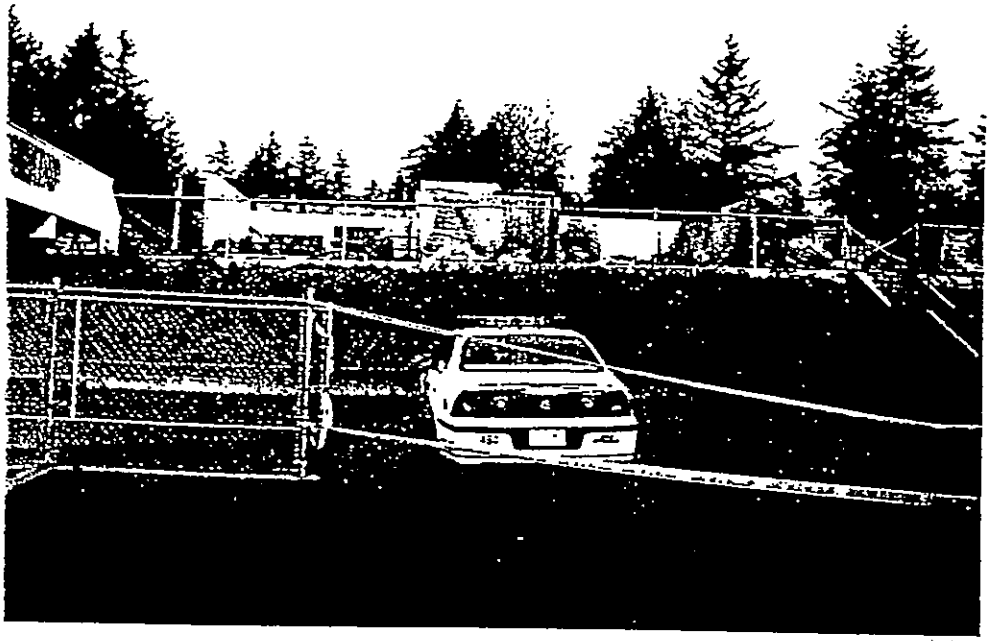


Figure 11 - Delta Sector showing extent of fire damage

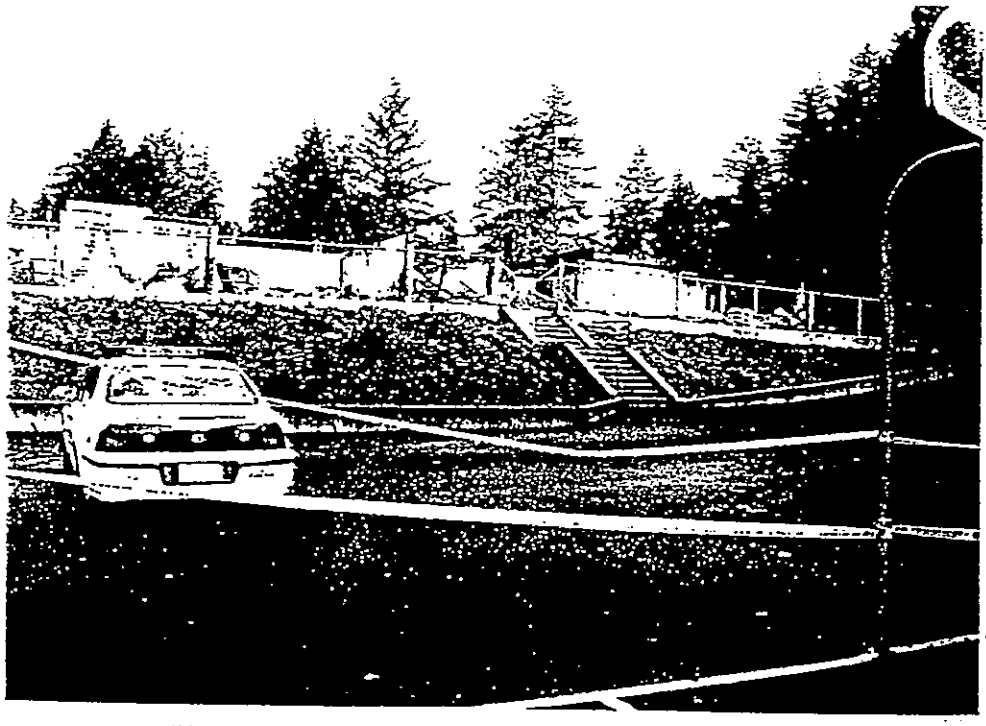


Figure 12 - Delta Sector showing extent of fire damage

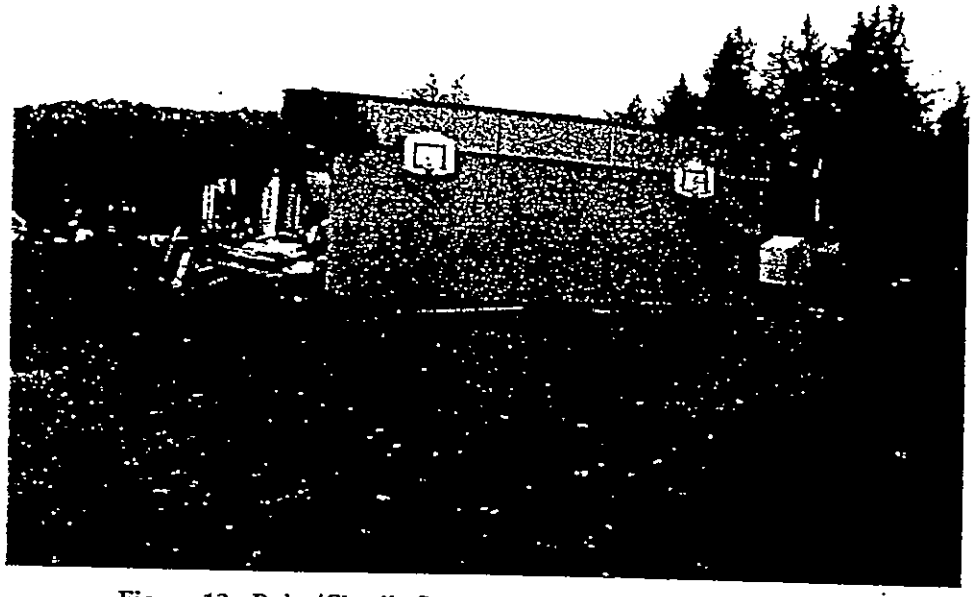


Figure 13 - Delta/Charlie Sectors showing extent of fire damage

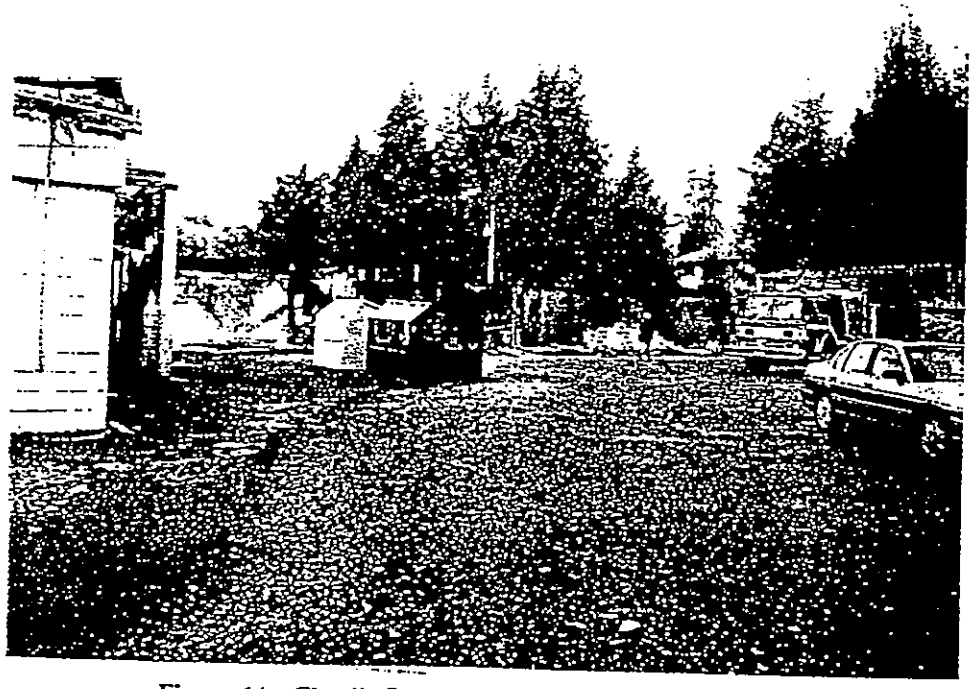


Figure 14 - Charlie Sector showing extent of fire damage

Figure 15 - Alpha Sector showing fire progressing **

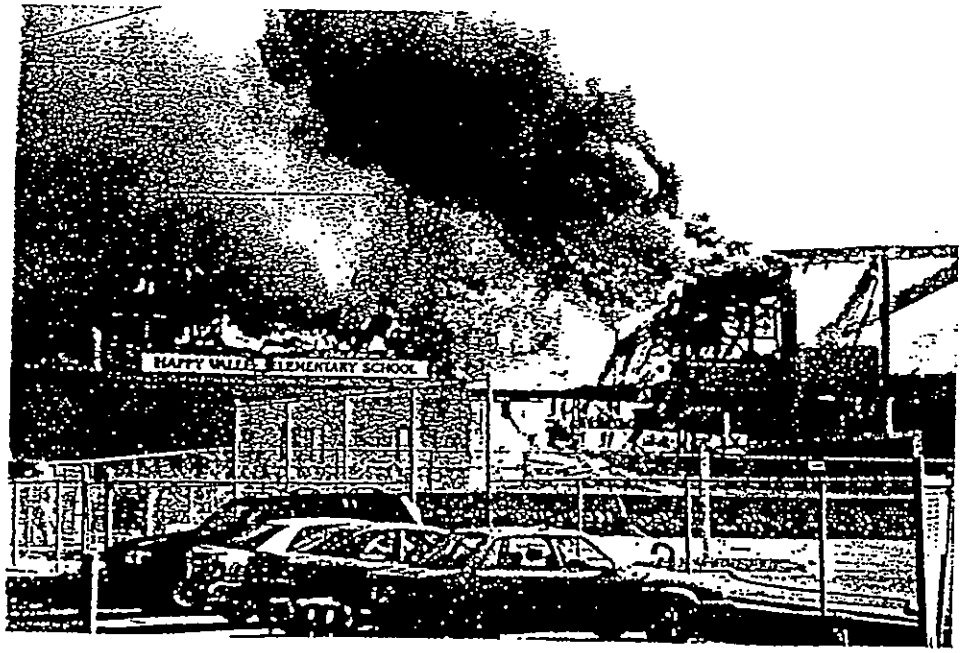


Figure 16 - Alpha Sector showing fire progressing **

Figure 17 - Bravo Sector location of first sighting of fire **

Figure 18 - Bravo Sector - fire and heat pattern indicators prior to reconstruction **

Figure 19 - Bravo Sector - showing exit route of staff and students from classrooms 2018/2019 **

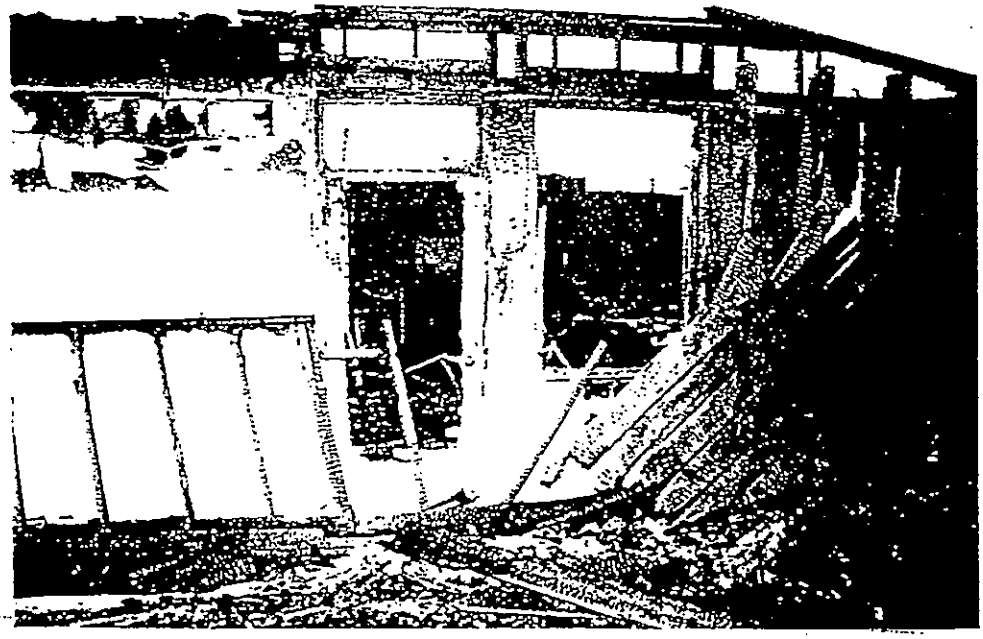


Figure 20 - Bravo Sector - Exterior of Multi-Purpose Room 2010 prior to reconstruction **

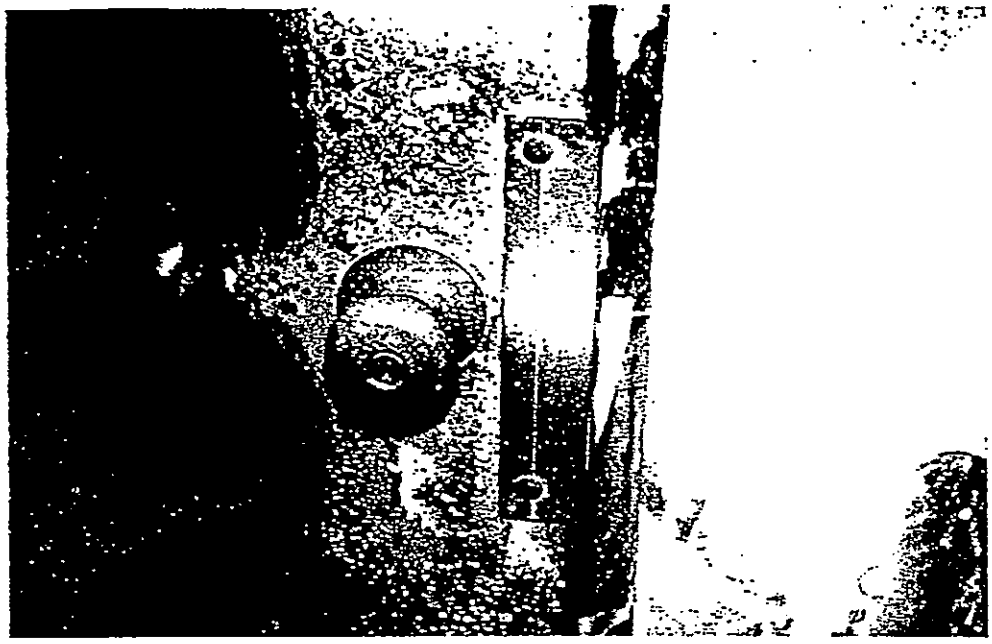


Figure 21 - Bravo Sector - Exterior door handle (knob) - Multi-Purpose Room 2010 **

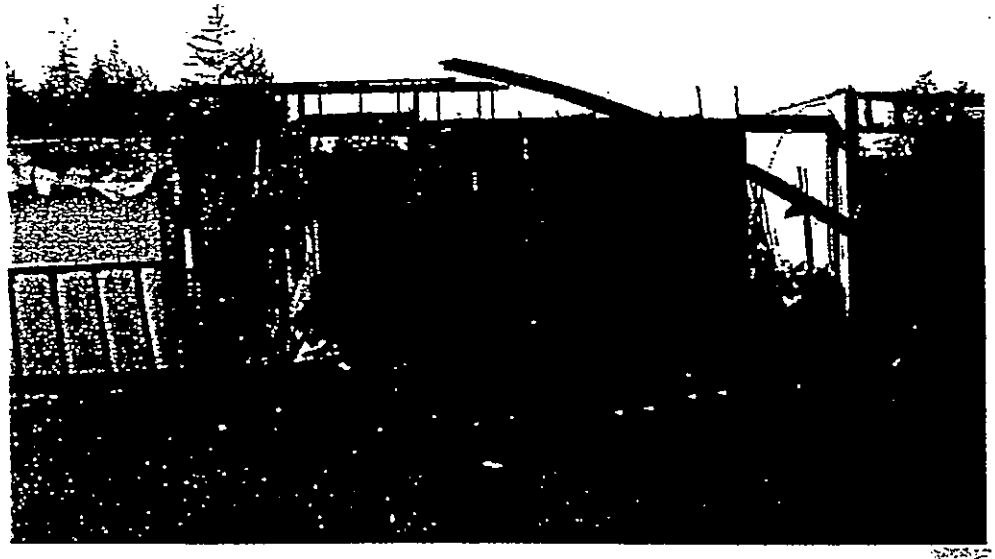


Figure 22 - Bravo Sector - Exterior Multi-Purpose Room 2010 prior to reconstruction **

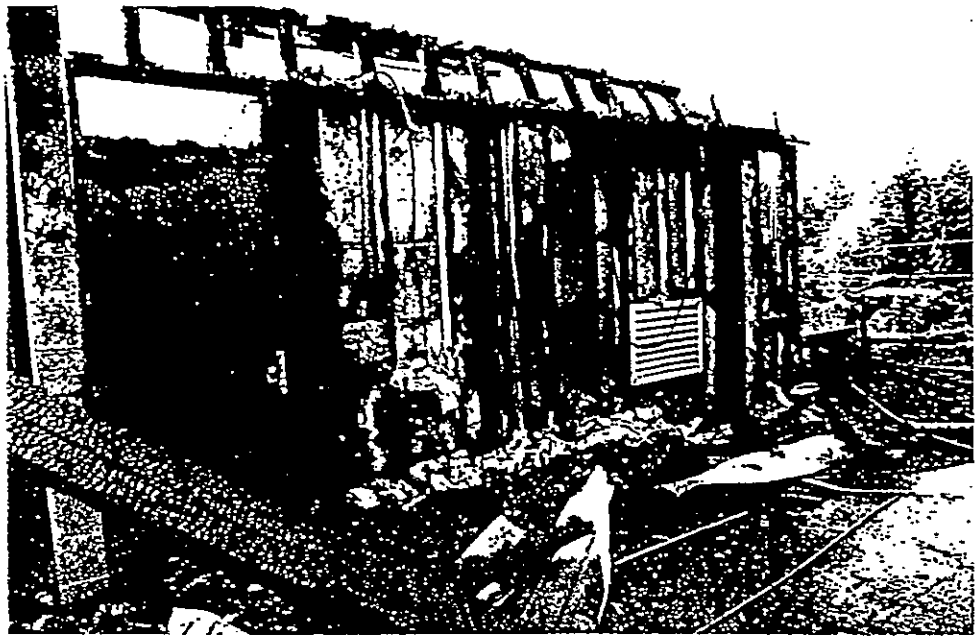


Figure 23 - Bravo Sector - Exterior Learning Assistance Room 2017 prior to reconstruction **

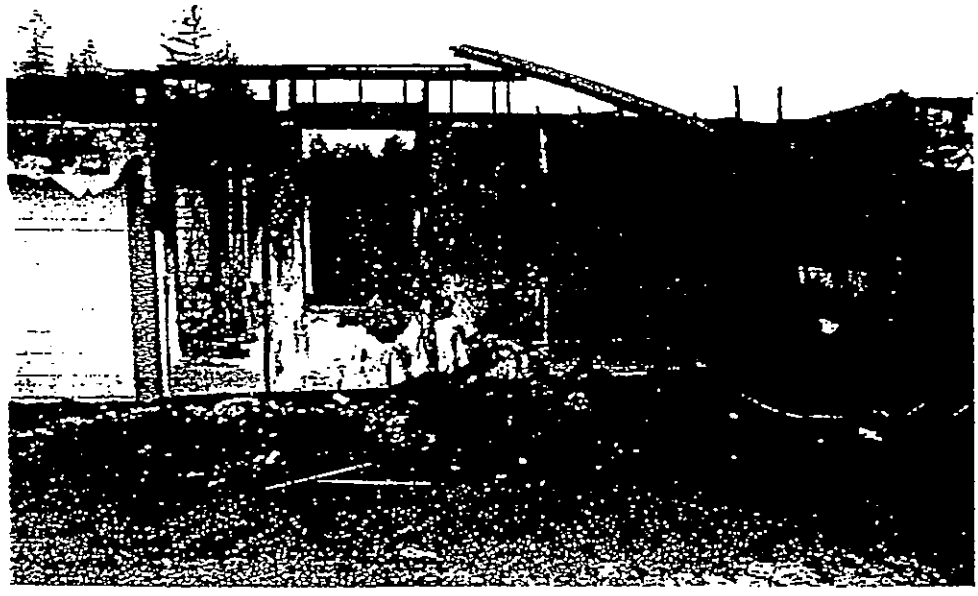


Figure 24 - Bravo Sector - Exterior Multi-Purpose Room 2010 during reconstruction **

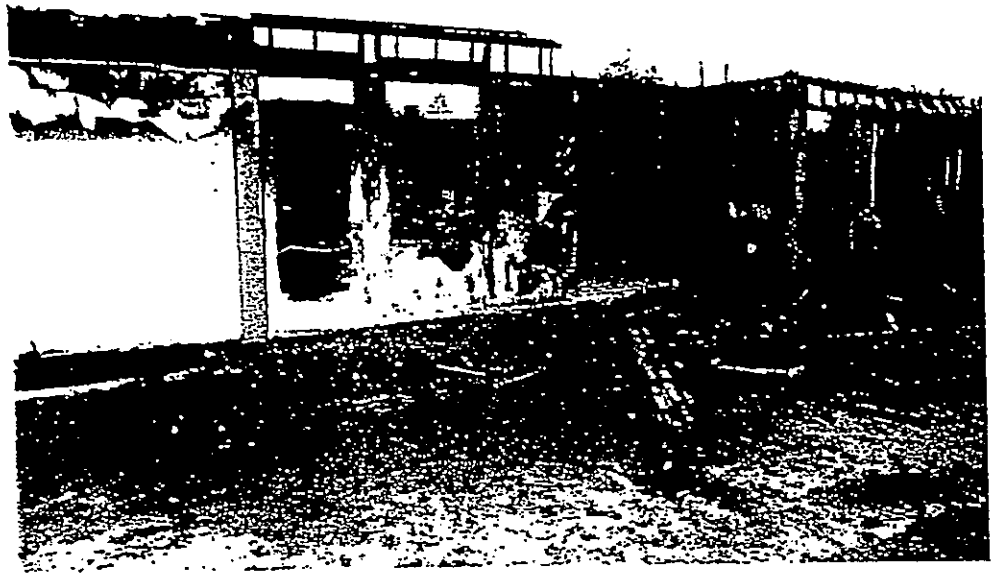


Figure 25 - Bravo Sector - Exterior Multi-Purpose Room 2010 upon completion of reconstruction **

Figure 26 - Bravo Sector - Exterior Door/Window Multi-Purpose Room 2010 **

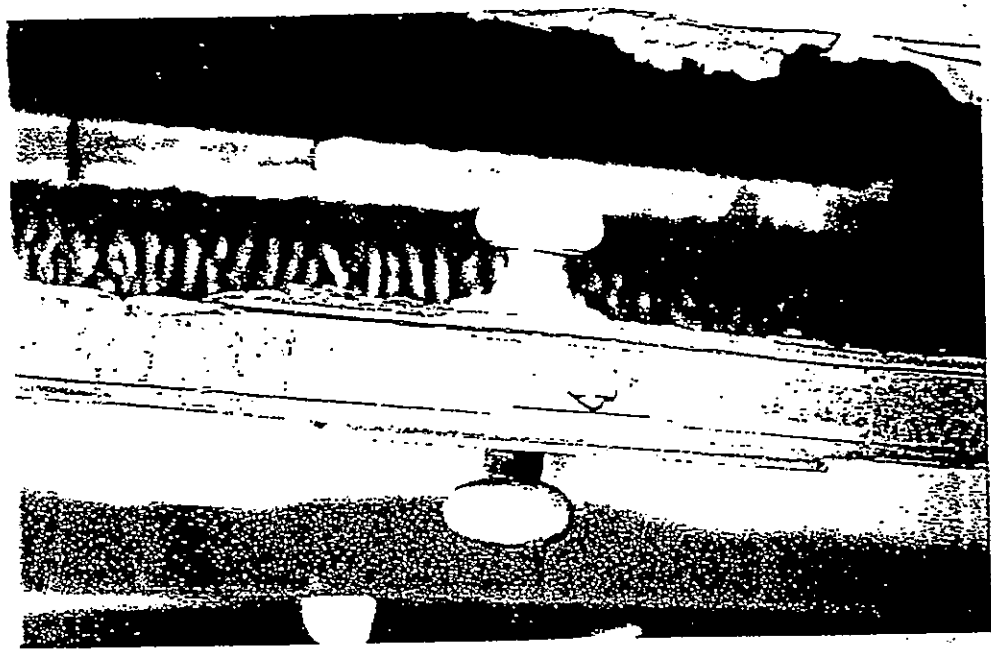


Figure 27 - Bravo Sector - Exterior door handles (knobs)- Multi-Purpose Room 2010 **

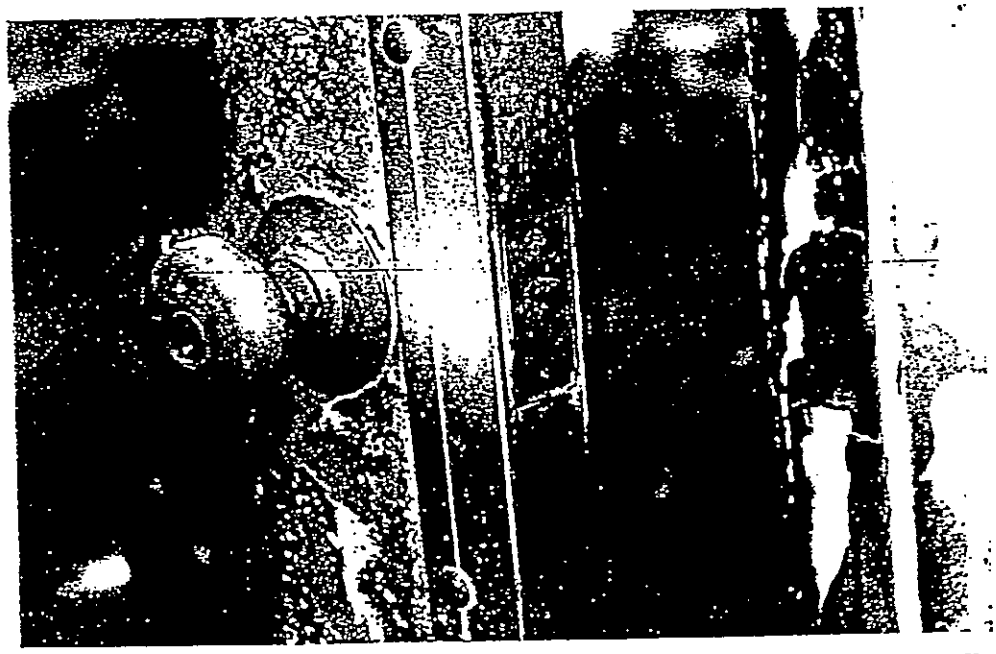


Figure 28 - Bravo Sector - Close up of door handle (knob) and locking device Multi-Purpose Room 2010 **

Figure 29 - Bravo Sector - Exterior door latching device - Multi-Purpose Room 2010 **

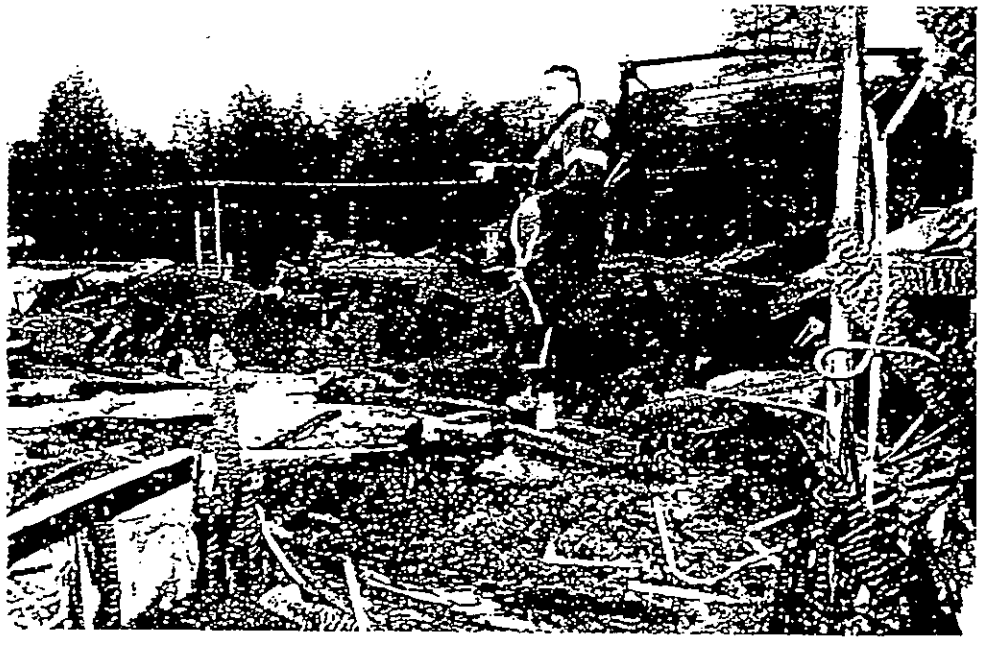


Figure 30 - "Dexter" / Paul Mahill working in fire scene **

Figure 31 - Area of Origin - Multi-Purpose Room 2010 prior to reconstruction **

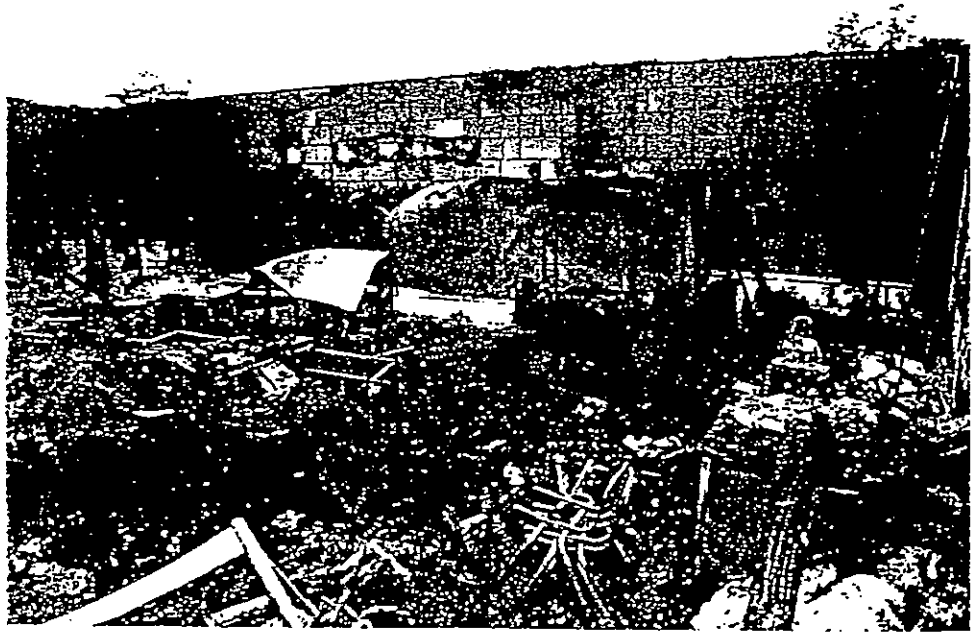


Figure 32 - Area of Origin - Multi-Purpose Room 2010 prior to reconstruction **

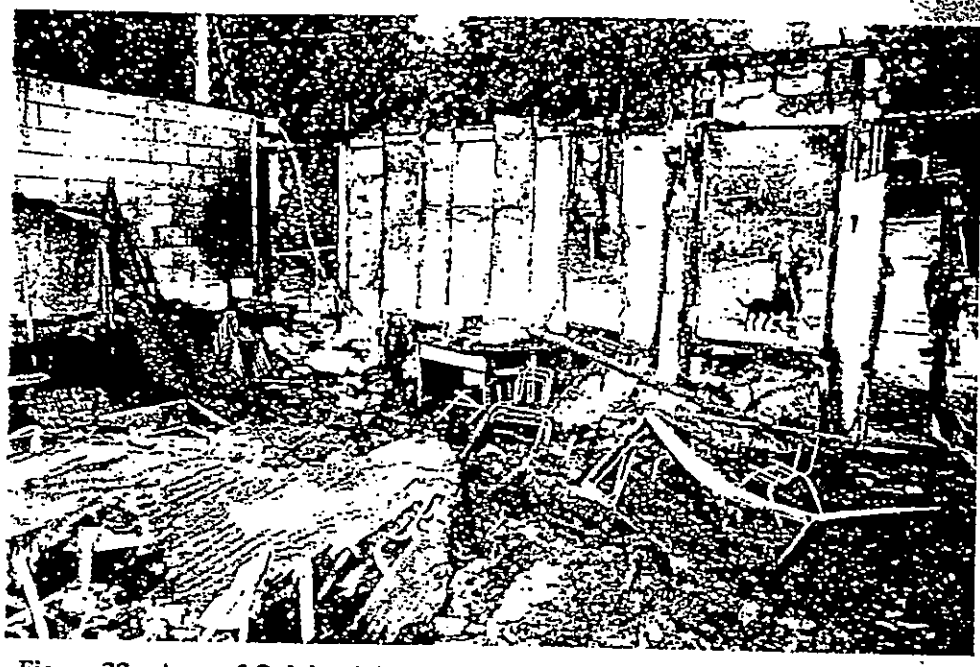


Figure 33 - Area of Origin - Multi-Purpose Room 2010 prior to reconstruction **

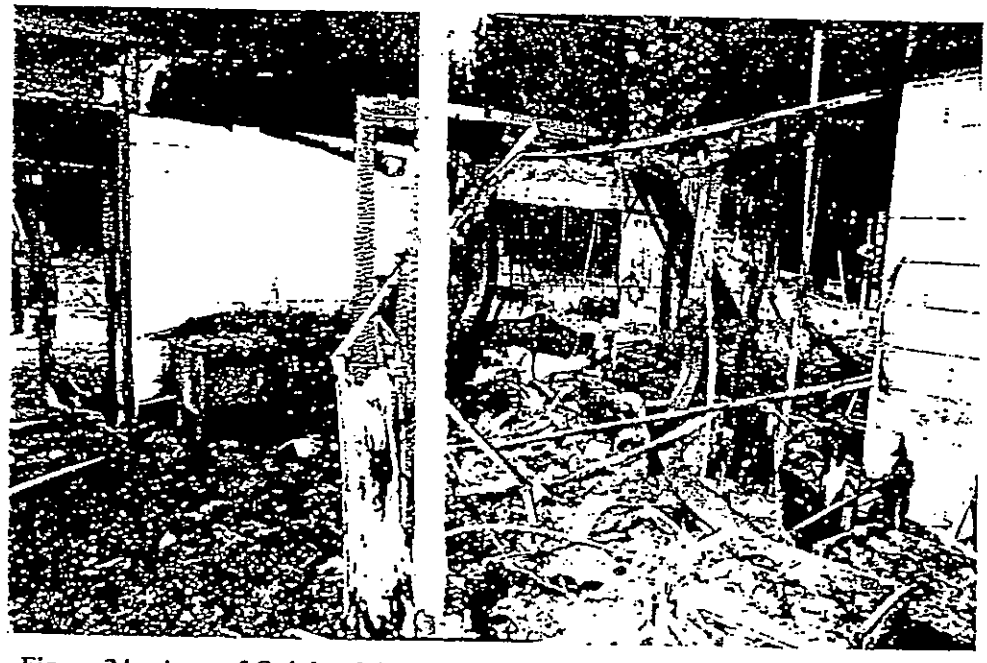


Figure 34 - Area of Origin - Multi-Purpose Room 2010 prior to reconstruction **

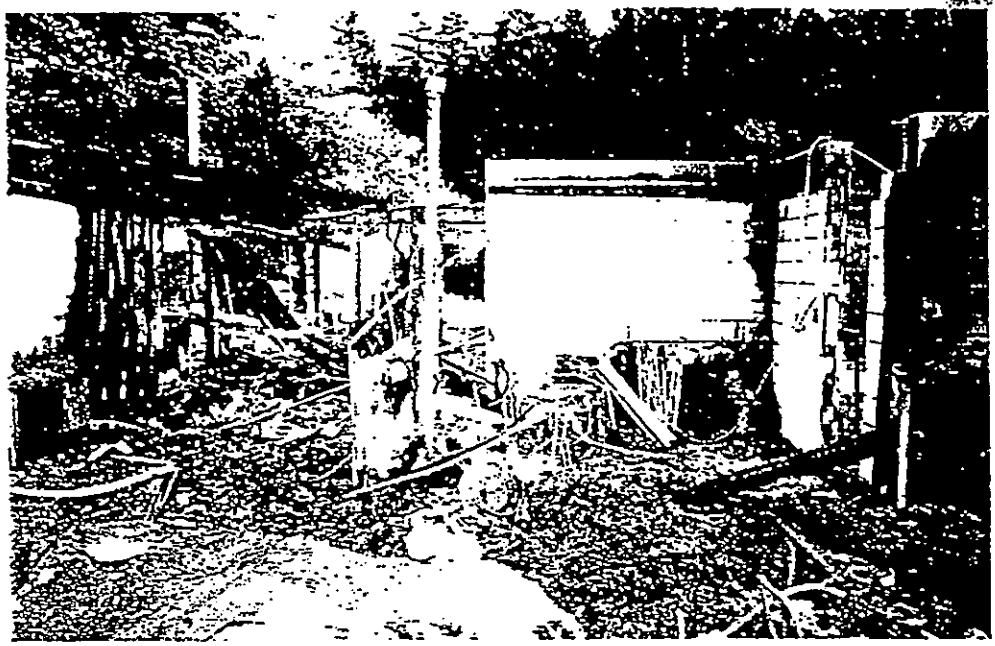


Figure 35 - Area of Origin - Multi-Purpose Room 2010 prior to reconstruction **

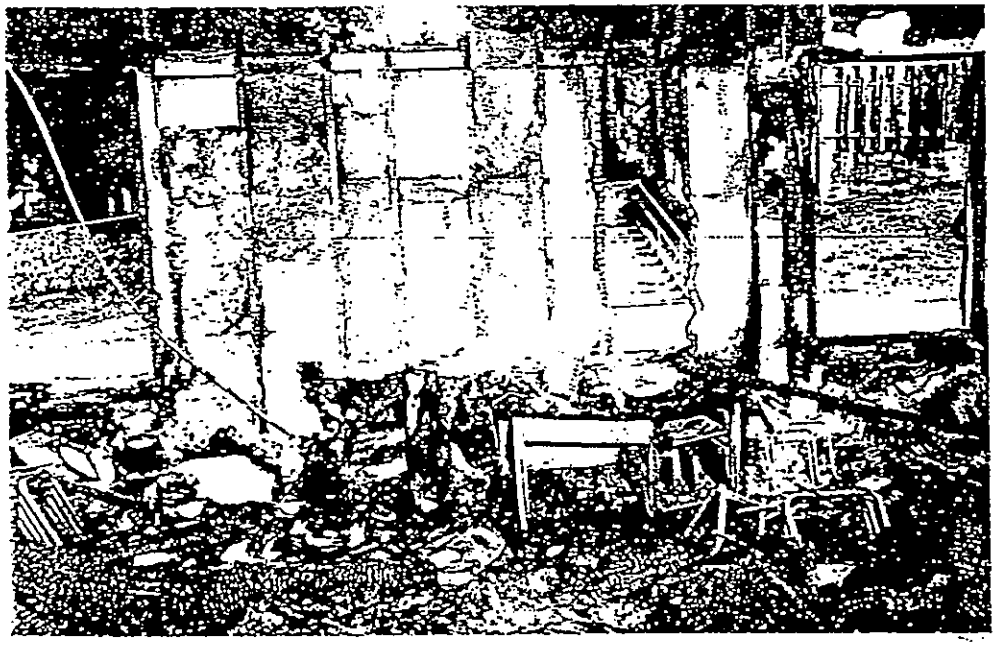


Figure 36 - Area of Origin - Multi-Purpose Room 2010 - Fire / Heat Pattern Indicators along exterior wall **

Figure 37 - Area of Origin - Multi-Purpose Room 2010 - Exterior door/window - fire and heat pattern indicators **

Figure 38 - Area of Origin - Multi-Purpose Room 2010 - exterior door/teachers desk - fire and heat pattern indicators **

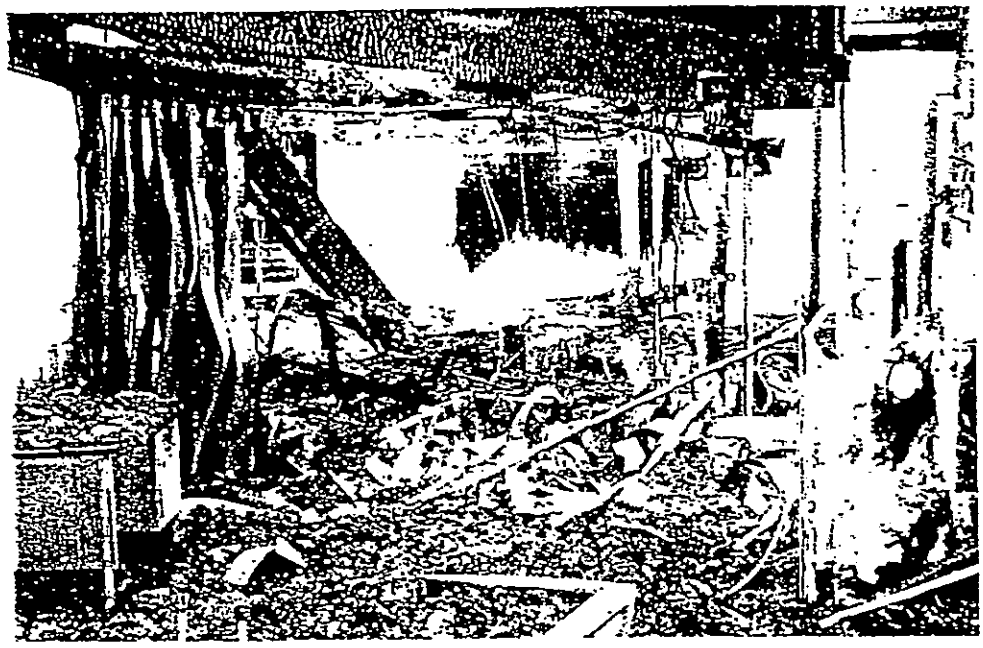


Figure 39 - Area of Origin - Multi-Purpose Room 2010 - Accordion partition wall showing fire and heat pattern indicators **

Figure 40 - Area of Origin - Multi-Purpose Room 2010 along exterior wall showing fire and heat pattern indicators **

Figure 41 - Area of Origin - Multi-Purpose Room 2010 along exterior wall showing fire and heat pattern indicators **

Figure 42 - Area of Origin - Multi-Purpose Room 2010 along the exterior wall showing the remains of the wood shelving unit and electric baseboard heater *

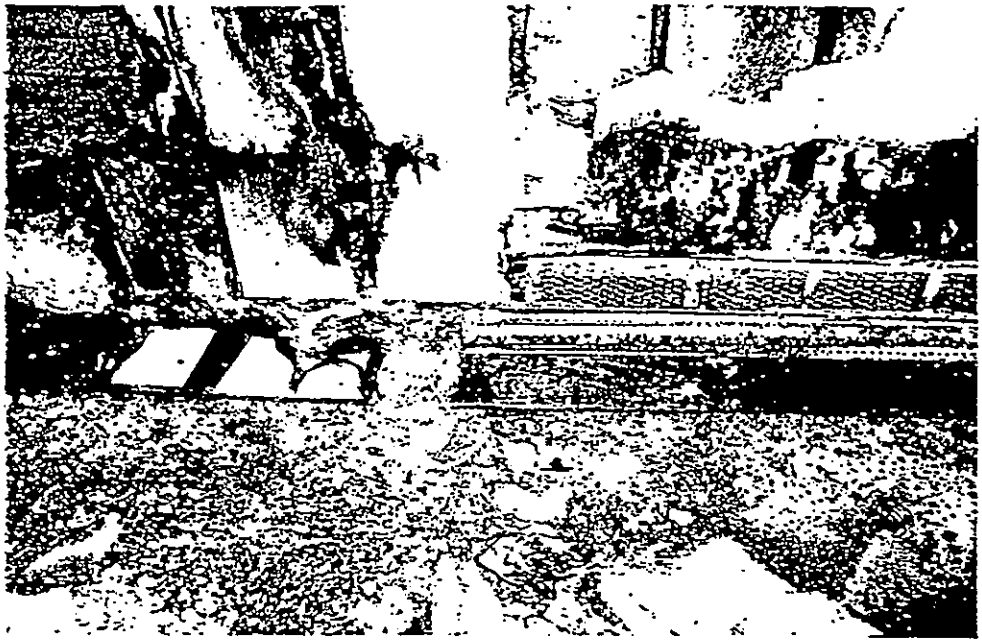


Figure 43 - Area of Origin - Multi-Purpose Room 2010 showing close-up of wood shelving unit and electrical baseboard heater *

Figure 44 Area of Origin - Multi-Purpose Room 2010 - Close up of electrical BX cable, safety fusing box, electrical outlet box to electrical baseboard heater *

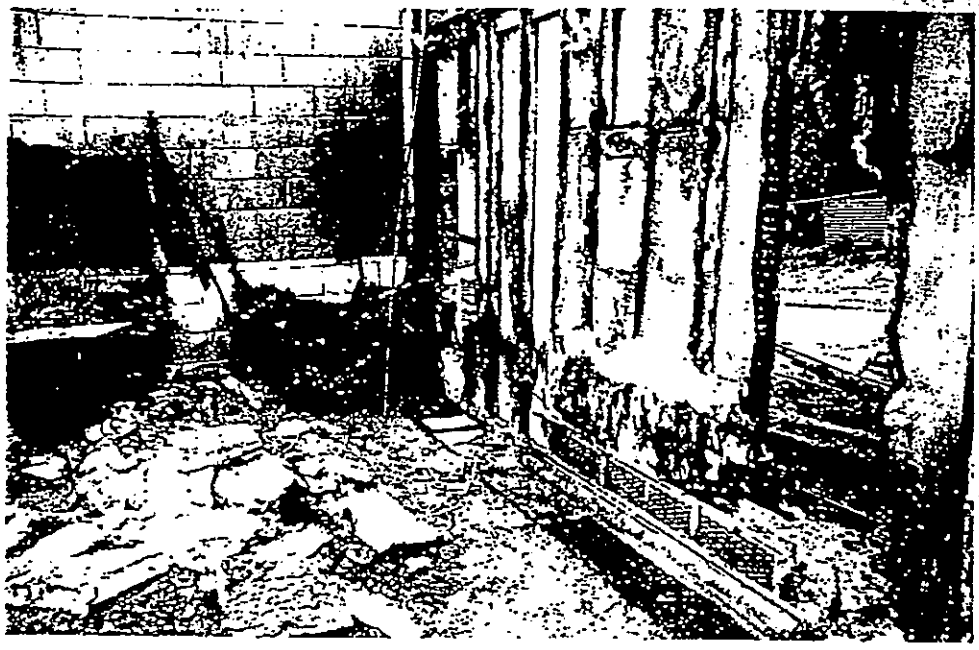


Figure 45 - Area of Origin - Multi-Purpose Room 2010 - showing electrical baseboard heater *

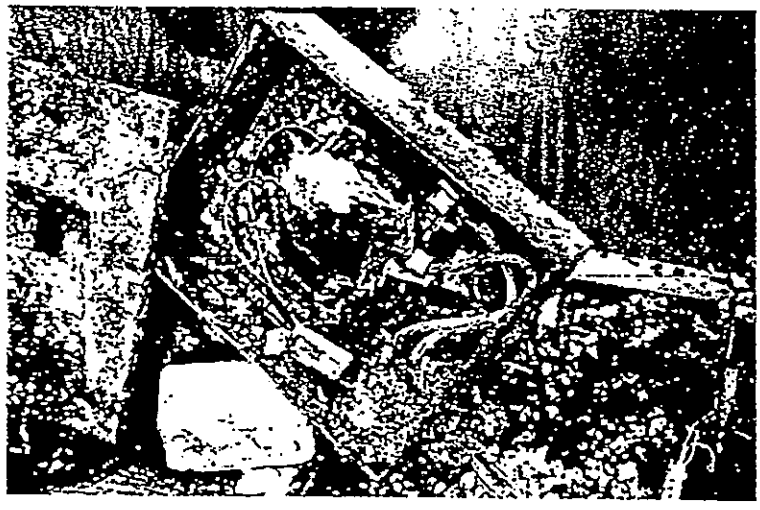


Figure 46 - Area of Origin - Multi-Purpose Room 2010 - showing close up of safety fusing box to electrical baseboard heater *

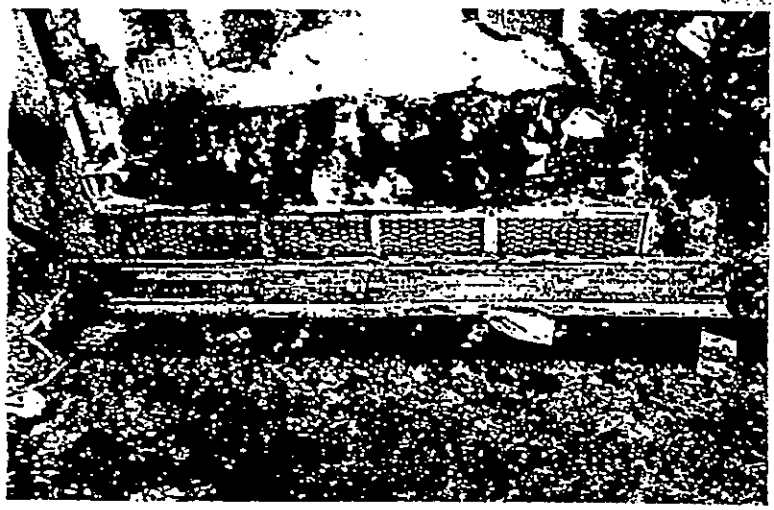


Figure 47 - Area of Origin - Multi-Purpose Room 2010 - electrical baseboard heater along exterior wall *

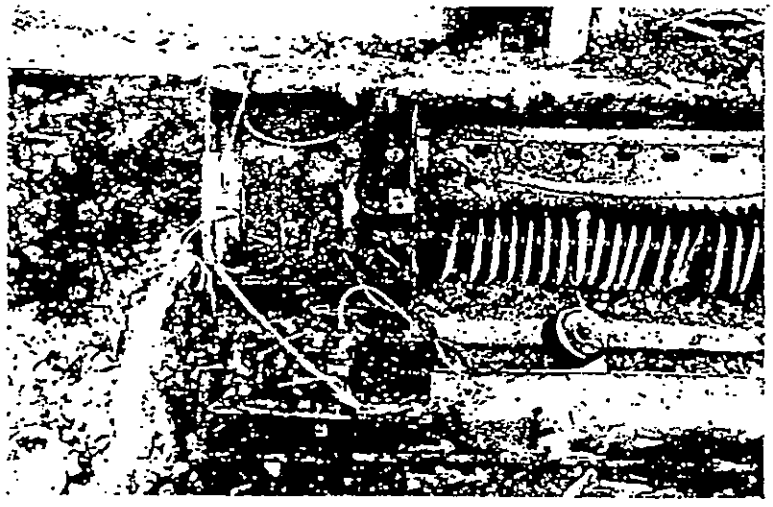


Figure 48 - Area of Origin - Multi-Purpose Room 2010 - Close up of electrical baseboard heater controls along exterior wall *

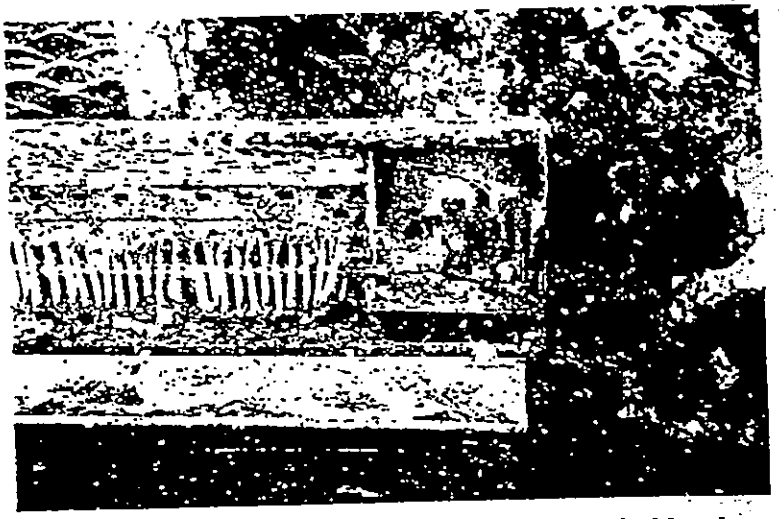


Figure 49 - Area of Origin - Multi-Purpose Room 2010 - Close up of Electrical baseboard heater controls along the exterior wall*

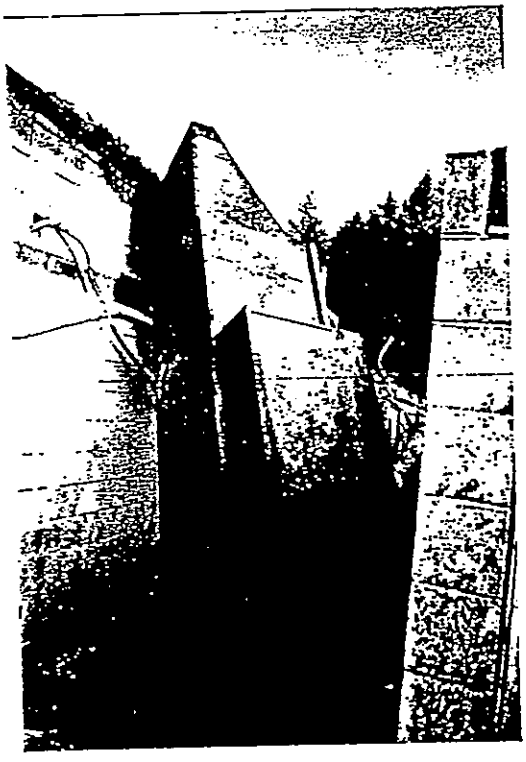


Figure 50 - Roof mounted electrical heating unit - Corridor 2027 (outside Library 2011 and Classroom 2013) *

Figure 51 - Charlie Sector - Corridor 2027 - looking at roof mounted electric heating unit position *

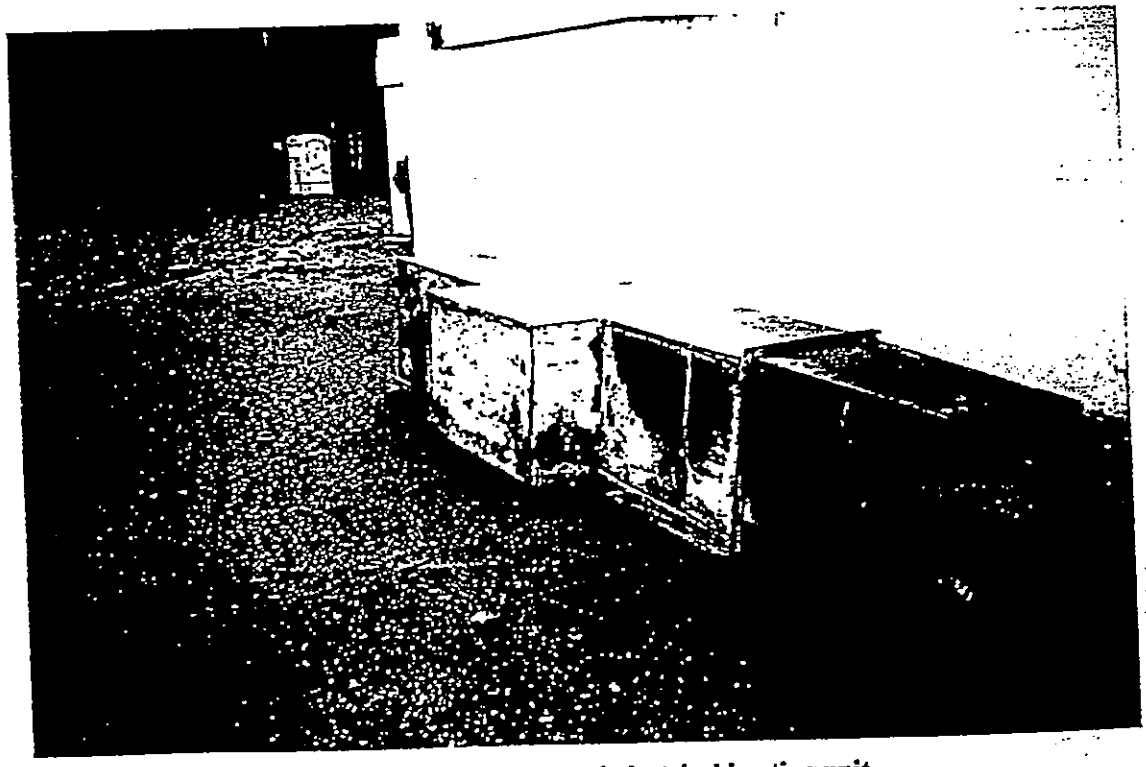


Figure 52 - Roof mounted electrical heating unit

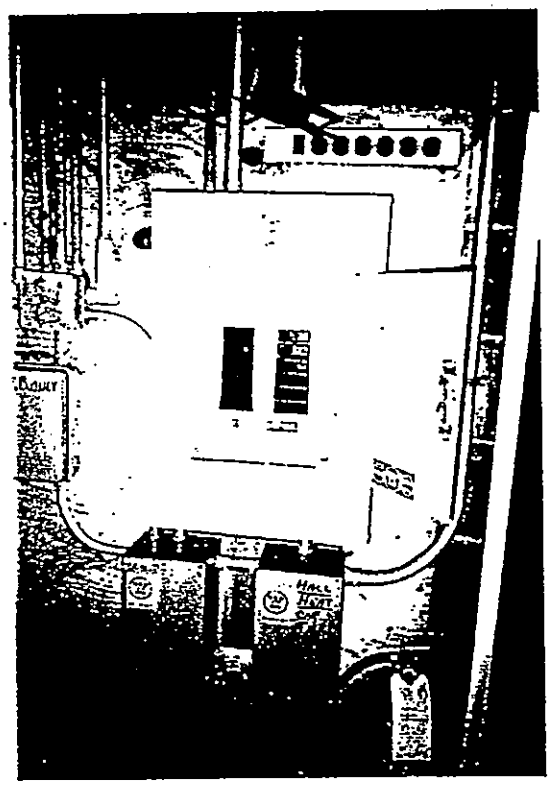


Figure 53 - Electrical Service Panel - Room 1001

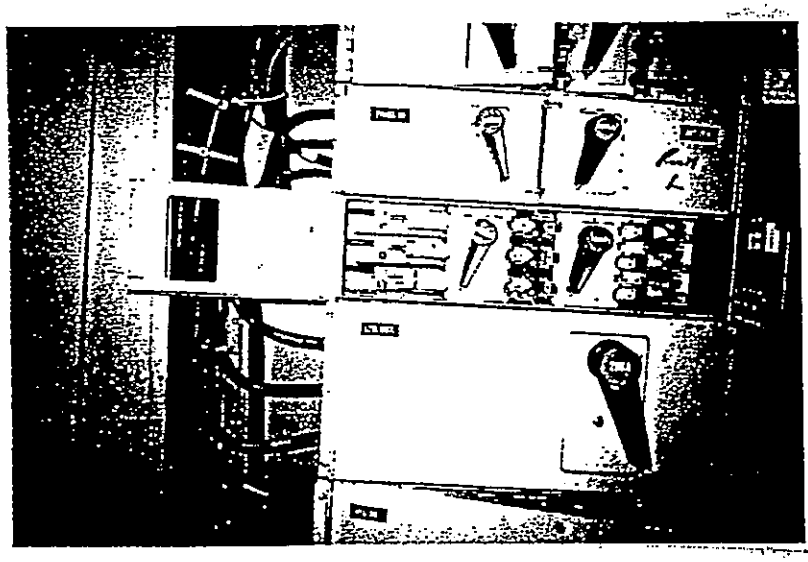


Figure 54 - Electrical Service Panels - Room 1002

Figure 55 - Area of Origin - Multi-Purpose Room 2010 - interior exit door to Corridor 2028 **