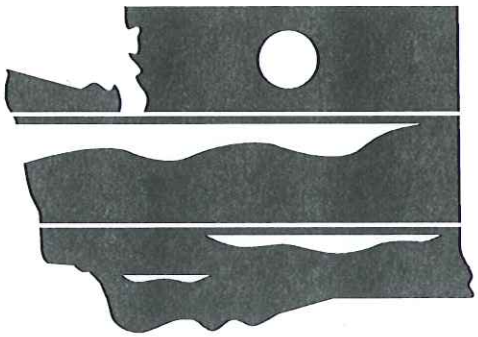

WASHINGTON STATE
DEPARTMENT OF
ECOLOGY

INTERIM REMEDIAL ACTION PLAN
APPLE VALLEY ELEMENTARY SCHOOL
YAKIMA, WASHINGTON

February 1, 2012

Prepared by Washington State Department of Ecology
Toxics Cleanup Program
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1.0 INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

The purpose of this Interim Remedial Action Plan is to fulfill the requirements of Washington Administrative Code (WAC) 173-340-430, which includes a requirement that, except in certain circumstances, a report be prepared before conducting an interim action under the Model Toxics Control Act.

1.2 SUMMARY OF PROPOSED INTERIM ACTION

The Department of Ecology proposes to excavate and haul away some of the soil contaminated with lead and arsenic for disposal at a permitted landfill, place a geotextile barrier over any remaining contaminated soil, import clean soil to the elementary school, and establish new grass in this clean soil. The plan includes modification of the existing irrigation system (underground solid set sprinklers) to maintain the turf cover.

2.0 BACKGROUND

2.1 AREA-WIDE SOIL CONTAMINATION TASK FORCE

In response to increasing public concerns on lead/arsenic contamination, the 2001 Washington State Legislature requested that Ecology prepare a statewide strategy to address lead and arsenic soil contamination. The project's main focus was on areas with low to moderate levels of lead and arsenic that have been developed into residential neighborhoods, schools, daycares, and parks.

Ecology's strategy includes the findings and recommendations of the Area-Wide Soil Contamination Task Force, a 17-person panel chartered by the Washington State Departments of Agriculture, Ecology, Health, and Community, Trade and Economic Development (the Agencies) to offer advice about a statewide strategy to respond to low- to moderate-level arsenic and lead soil contamination in Washington State. The completed report, **Area-Wide Soil Contamination Task Force Report,** Ross & Associates Environmental Consulting, Ltd., Landau Associates, Inc., Hubbard Gray Consulting, Inc, June 30, 2003, can be found online at http://www.ecy.wa.gov/programs/tcp/area_wide/Final-Report/PDF/TF-Report-final.pdf.

Task Force deliberations focused on understanding the nature and extent of area-wide soil contamination, making recommendations about effective, practical, and affordable steps individuals and organizations can take to reduce their potential for exposure to area-wide soil contamination, and on creating an alternate, more streamlined approach under MTCA for properties affected by area-wide soil contamination.

Specifically, the Task Force recommendations and Ecology's implementation strategy for schools affected by area-wide soil contamination include the following:

- implement individual protection measures such as appropriate hygiene, precautionary measures when working in soil, and cleaning methods, as recommended by the Department of Health
- maintain good grass and landscaping cover over soil in areas where children play
- conduct qualitative evaluations to increase the understanding of where exposure could occur
- test soils where qualitative evaluations indicate the potential for exposure to contaminated soil, and
- implement additional protection measures such as installing geotextile barrier fabric between contaminated soils and surfacing materials in play areas or more permanent protection measures if contamination is found.

2.2 CONTAMINANTS OF CONCERN

The main contaminants of concern at these sites are the toxic metals, lead and arsenic. Long-term exposure to elevated levels of arsenic may cause cancer, whereas long-term exposure to lead may affect and impair the human nervous system and proper brain function. More information on the short- and long-term effects of lead and arsenic can be found at http://www.doh.wa.gov/Topics/childhood_lead_poisoning.htm.

2.3 AREA SOIL TESTING AND INITIAL INTERIM ACTIONS

Between 2001 and 2005, Ecology assisted school districts in conducting soil sampling for lead and arsenic contamination at school sites. A total of 35 schools located in Okanogan, Douglas, Chelan, and Yakima counties had soil contamination significantly higher than Washington State cleanup standards.

Ecology began implementing interim cleanup actions at public schools in 2006. Twenty schools in four counties have been cleaned up thus far. In Yakima County seven schools have been remediated thus far; Gilbert Elementary, Robertson Elementary, Hoover Elementary, McKinley Elementary, Barge-Lincoln Elementary, Garfield Elementary, and Naches Elementary. The design, contracting, and oversight of construction for these cleanup projects were funded by Ecology through the Safe Soils program.

2.4 APPLE VALLEY ELEMENTARY SCHOOL SITE ASSESSMENT

Of 40 soil samples taken from the Apple Valley Elementary School playfield in August 2005, 38 samples exceeded the state cleanup standards for arsenic and 23 exceeded for lead. The 40 arsenic samples showed an average concentration of 54.4 milligrams per kilogram (mg/kg). The maximum concentration detected for arsenic was 124.2 mg/kg, more than six times the state cleanup standard of 20 mg/kg. For lead, the 39 samples showed an average concentration of 322.4 mg/kg, with a maximum concentration of 1082.9 mg/kg. The state cleanup standard for lead is 250 mg/kg.

3.0 DESIGN CONSIDERATIONS

3.1 STATE CLEANUP REGULATION

According to the state cleanup regulation[1], an "interim action" is distinguished from a "cleanup action" in that an interim action only partially addresses the cleanup of a site. (The remediation conducted under an interim action may end up constituting the complete cleanup action for a site, however, if the interim action subsequently is shown to meet requirements in the rule for a complete cleanup action.) The state regulation defines three categories of interim actions.

The interim action proposed for the Apple Valley Elementary site qualifies under the following one of the three categories defined in the state rule. WAC 173-340-430 (a) defines an interim action as "A remedial action that is technically necessary to reduce a threat to human health or the environment by eliminating or substantially reducing one or more pathways for exposure to a hazardous substance at a facility." By reducing the proximity of school children to the hazardous substances, the interim action will reduce the threat to human health posed by the pathways of contact and ingestion.

WAC 173-340-430 (2) states that interim actions may:

(a) Achieve cleanup standards for a portion of the site

(b) Provide a partial cleanup, that is, clean up hazardous substances from all or part of the site, but not achieve cleanup standards; or

(c) Provide a partial cleanup of hazardous substances and not achieve cleanup standards, but provide information on how to achieve cleanup standards for a cleanup; for example, an unproven cleanup technology demonstration project.

Additional requirements of an interim action, as stated in WAC 173-340-430, are that the interim action will be consistent with the cleanup action and that the interim action shall not foreclose reasonable alternatives for the cleanup action. (The rule provides the following qualifier to the latter requirement: "This is not meant to preclude the destruction or removal of hazardous substances.") A Cleanup Action Plan has not yet been written for the Apple Valley school site, but this interim action is consistent with the cleanup typical alternatives considered for lead/arsenic contaminated sites in Central Washington.

3.2 INTERIM ACTION ALTERNATIVES

The following cleanup action alternatives were considered for the Apple Valley Elementary School Site:

- No action – This option was not selected because the situation has not been stabilized at a status that gives sufficient assurance of on-going isolation of the contaminated soil from school children.

[1]WAC 173-340-430(1)

- **Capping the contaminated soil with a barrier such as permeable geotextile fabric, and clean imported soil – This option was selected because it provides protection equal to the other options at a greatly reduced cost. Excavation would be ~300% more costly and deep mixing is not technically feasible at the site.**

- Institutional controls do not address the contamination in the soil but rely on practices to control exposure to the contamination. Examples could include educating students and others about soil contamination; maintaining features such as existing grass which provide some barrier to contamination; preventing digging in the school yard; restricting access to the school yard; requiring students to wash hands following recess; having school maintenance staff wet-mop floors and use high efficiency particulate air (HEPA) filter vacuum cleaners; fencing; signage; and restrictive covenant limiting use of the land – Institutional controls were not selected as the sole option because it is not considered as effective as other alternatives due to the difficulty in enforcing 100 percent compliance with some of the practices. Also, one institutional control (restricting access to the playfield) would render the playfield useless as a playfield even if could be accomplished successfully. Despite these shortcomings, some institutional controls such as hand washing and prevention of digging do provide additional benefit when used in conjunction with more universally effective measures.

- Deep Mixing – Contaminated soil would be mixed with underlying clean soils to a depth of four feet. Mixing of contaminated soils may reduce the overall soil contamination to a "clean" standard if area contaminant concentrations are not too high and do not extend too deep. Deep mixing requires large, specialized machinery which cannot be operated efficiently in small areas or around obstacles. The use of deep mixing is also limited to areas where deep soils are present and terrain is relatively flat and open. Deep mixing generally requires replacement of irrigation system piping and utilities located within the mixing zone. Deep mixing was not selected because the size and layout of the school would not justify the use of equipment necessary to accomplish the task.

- Removal of Contaminated Soil – Physical removal by excavation was not selected due to the large quantities of soil that would need to be removed and replaced with clean topsoil for successful remediation.

4.0 INTERIM CLEANUP ACTION PLAN

A qualified and experienced contractor will perform the following work during summer 2012:

Existing sod will be tilled to a depth of approximately six inches; contaminated soil adjacent to buildings, pavement, fences, etc. will be excavated and disposed as necessary to maintain existing grade at those features; geotextile fabric will be placed over all areas of the property where contaminated soil remains above cleanup levels; a minimum of eight inches of clean imported topsoil will be placed over the fabric; topsoil amendments will be added as needed;

new turf will be established; playground equipment pits will be excavated, lined with geotextile fabric, and refilled with wood chips certified for playground use; the elevation of goal posts and play equipment will be adjusted as needed to meet grade; the irrigation system will be modified or replaced as necessary to support establishment and maintenance of grass; a storm water drain system will be installed to accommodate runoff from the parking area. Complete excavation and disposal of contaminated soil and replacement with clean topsoil may be utilized in lieu of capping in areas where practical and economically feasible.

4.1 SAFETY AND HEALTH

Public access to the site will be restricted during the construction period. The Safety and Health Plan will address construction hazards and hygiene. No other known or special hazards exist at this site. The contractor will be required to provide a specific Safety & Health Plan for the site construction activities.

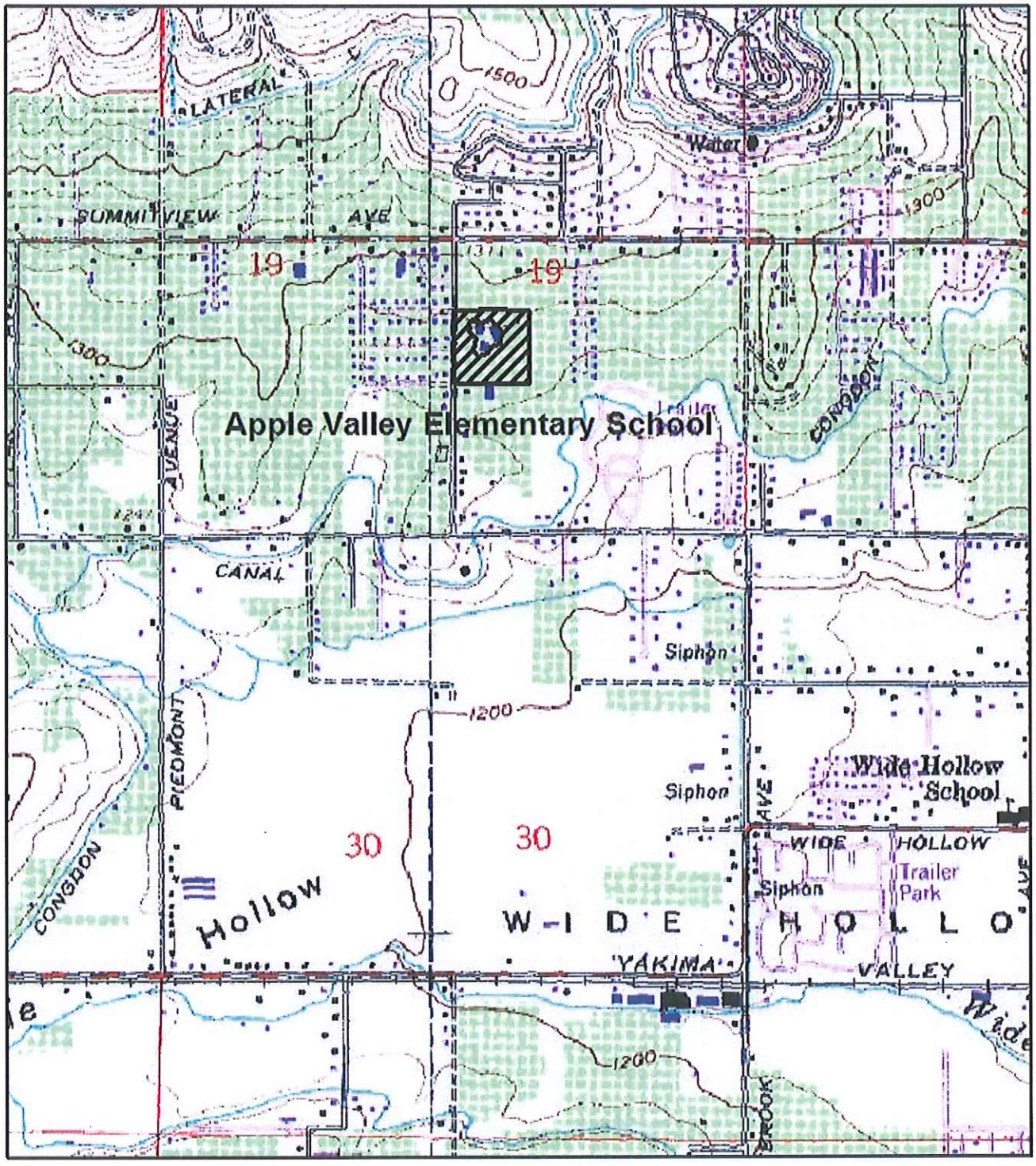
4.2 OPERATION AND MAINTENANCE PLAN

West Valley School District will develop an operation and maintenance plan which describes work practices to limit child and employee exposure to lead and arsenic contaminated soil.

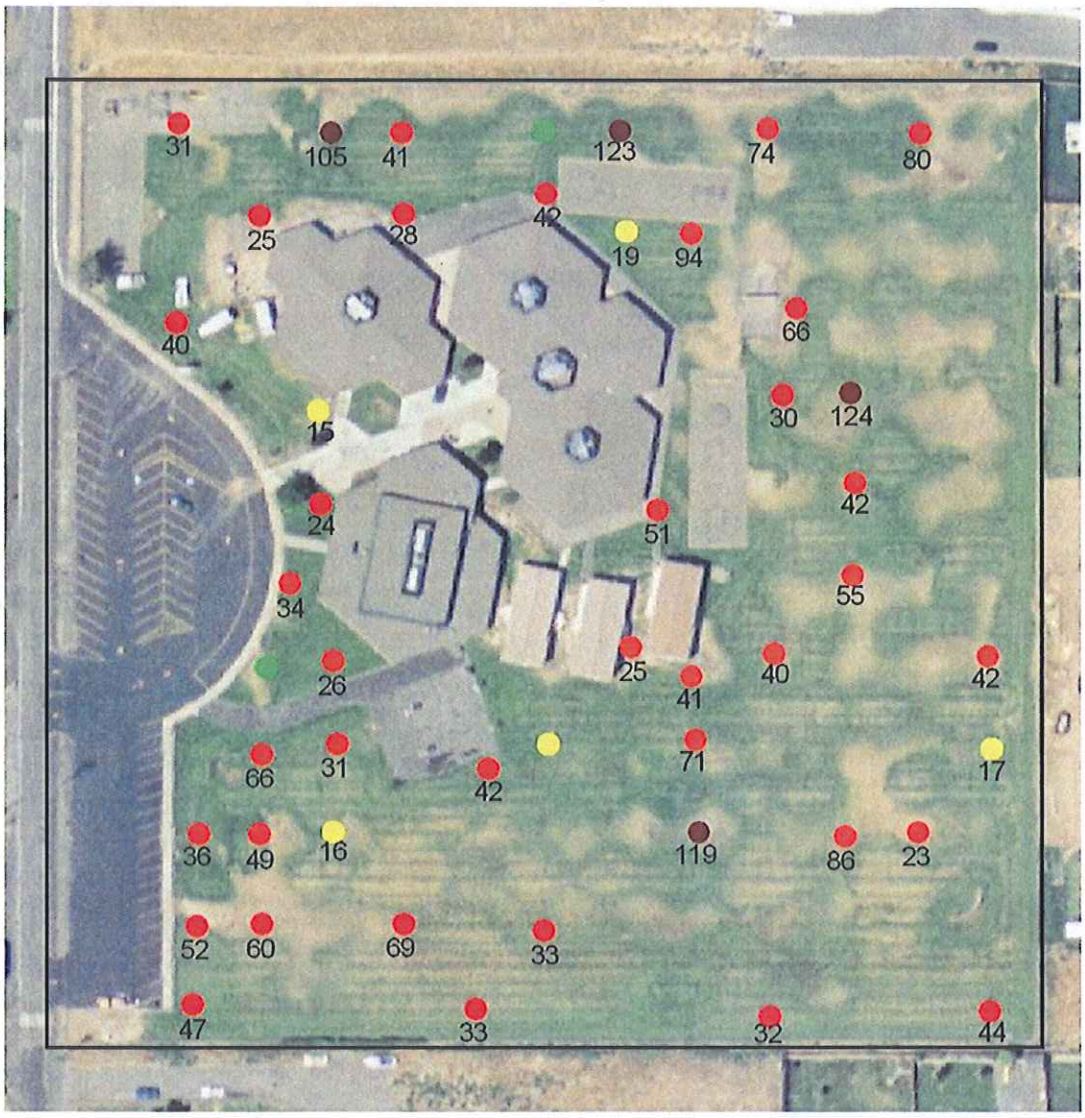
5.0 ABBREVIATIONS AND ACRONYMS

Ecology	Washington State Department of Ecology
MTCA	Model Toxics Control Act (Washington state law)
WAC	Washington Administrative Code (Washington state regulations)

Apple Valley Elementary School Vicinity Map



Apple Valley Elementary School Arsenic Values



100 0 100 200 300 400 500 Feet

Arsenic Values (ppm):

- No signifigant level of As found in sample
- 15-19
- 20-99
- 100+
- ### As in ppm

Location:
N 46 35 51.0
W 120 37 29.4

Apple Valley Elementary School Lead Values

100 0 100 200 300 400 500 Feet

Lead Values (ppm):

- No signifigant level of Pb found in sample
- 200-249
- 250-499
- 500+
- ### Pb in ppm

Location:
N 46 35 51.0
W 120 37 29.4

Apple Valley Elementary School

Date	Sample ID	As	Pb
9-Mar-05	AVES1	40.33	153.92
9-Mar-05	AVES2	25.32	161.65
9-Mar-05	AVES3	27.98	118.23
9-Mar-05	AVES4	41.39	319.36
9-Mar-05	AVES5	105.07	601.68
9-Mar-05	AVES6	42.12	157.03
9-Mar-05	AVES7	18.92	72.02
9-Mar-05	AVES8	93.62	364.98
9-Mar-05	AVES9	123.16	785.56
9-Mar-05	AVES10	73.88	600.51
9-Mar-05	AVES11	80.22	426.26
9-Mar-05	AVES12	65.78	21.91
9-Mar-05	AVES13	20.73	119.21
9-Mar-05	AVES14	124.21	784.31
9-Mar-05	AVES15	51.26	201.19
9-Mar-05	AVES16	55.25	648.2
9-Mar-05	AVES17	41.77	331.62
9-Mar-05	AVES17	41.64	331.47
9-Mar-05	AVES17	43.98	328.82
9-Mar-05	AVES18	40.21	115.49
9-Mar-05	AVES19	70.9	80.14
9-Mar-05	AVES20	25.37	160.35
9-Mar-05	AVES21	119.19	1082.88
9-Mar-05	AVES22	109.25	583.22
9-Mar-05	AVES23	43.81	147.25
9-Mar-05	AVES24	32.96	203.69
9-Mar-05	AVES25	68.59	618.74
9-Mar-05	AVES26	52.14	516.63
9-Mar-05	AVES27	47.01	410.09
9-Mar-05	AVES28	35.58	366.31
9-Mar-05	AVES29	49.28	336.09
9-Mar-05	AVES30	66.3	321.15
9-Mar-05	AVES31	30.91	222.45
9-Mar-05	AVES32	41.51	189.88
9-Mar-05	AVES33	25.87	110.76
9-Mar-05	AVES34	34.03	154.36
9-Mar-05	AVES35	23.95	161.48
9-Mar-05	AVES36	15.47	47.38
9-Mar-05	AVES37	41.43	99.17
9-Mar-05	AVES38	85.75	442.28
Average Reading:		**54.4035**	**322.443**