DRAFT

Wildfire Evacuation Plan

Moon Camp

SEPTEMBER 2023

Prepared for:

Kaitlyn Dodson-Hamilton
VICE PRESIDENT — ENVIRONMENTAL SPECIALIST
TOM DODSON & ASSOCIATES

Prepared by:

DUDEK

605 Third Street
Encinitas, California 92024
Contact: Michael Huff

Table of Contents

SECTION **PAGE NO.**

TABLES

FIGURES

APPENDICES

INTENTIONALLY LEFT BLANK

Acronyms and Abbreviations

Acronym/Abbreviation	Definition
ARC	American Red Cross
CAL FIRE	California Department of Forestry and Fire Protection
CBC	California Building Code
CALTRANS	California Department of Transportation
CERT	Community Emergency Response Team
CHP	California Highway Patrol
County	County of San Bernadino
CRA	CR Associates
DOC	Department Operations Center
DEH	Department of Environmental Health Services
EAS	Emergency Alert System
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
FEMA	Federal Emergency Management Agency
FHA	Fire Hazard Abatement Program
Guidance	California Office of the Attorney General's October 2022 Guidance
IC	Incident Command
ICS	Incident Command System
IFTSA	International Fire Service Training Association
LRA	Local Responsibility Area
NIMS	National Incident Command System
NWFCG	National Wildland Fire Coordinating Groups
OA	Operational Area
OES	County of San Bernardino Office of Emergency Services
Project	Moon Camp Project
SBCFD	San Bernadino County Fire Department
SBCSD	San Bernadino County Sheriff's Department
SCAG	Southern California Association of Governments
SB Ready	San Bernardino Ready App
SEMS	State Emergency Management System
SR-38	State Route 38
TEP	Temporary Evacuation Point
TENS	Telephone Emergency Alert System
TRA	Temporary Refuge Area
UC	Unified Command
VOAD	Volunteers Active in Disasters
VoIP	Voice over Internet Protocol
WUI	Wildland-Urban Interface

INTENTIONALLY LEFT BLANK

Quick Reference - Wildfire Preparedness

The Quick Reference Guide provides helpful tips and educational resources, so occupants are prepared in the event of a wildland fire evacuation.

Figure 1 illustrates the emergency evacuation routes potentially available to the Moon Camp Project and surrounding communities. Figure 2 displays the Project's vicinity location and Figure 3 is the Project's site plan.

The Project's evacuation routes for residents and visitors of the Project are detailed in Section 4 and illustrated in Figure 1. Residents and visitors should know available routes, stay informed, and follow directions provided by law enforcement or fire agencies, news media, and other credible sources. Do not rely on navigation apps that may inadvertently lead persons toward the approaching wildfire.

Nearest Medical Facilities

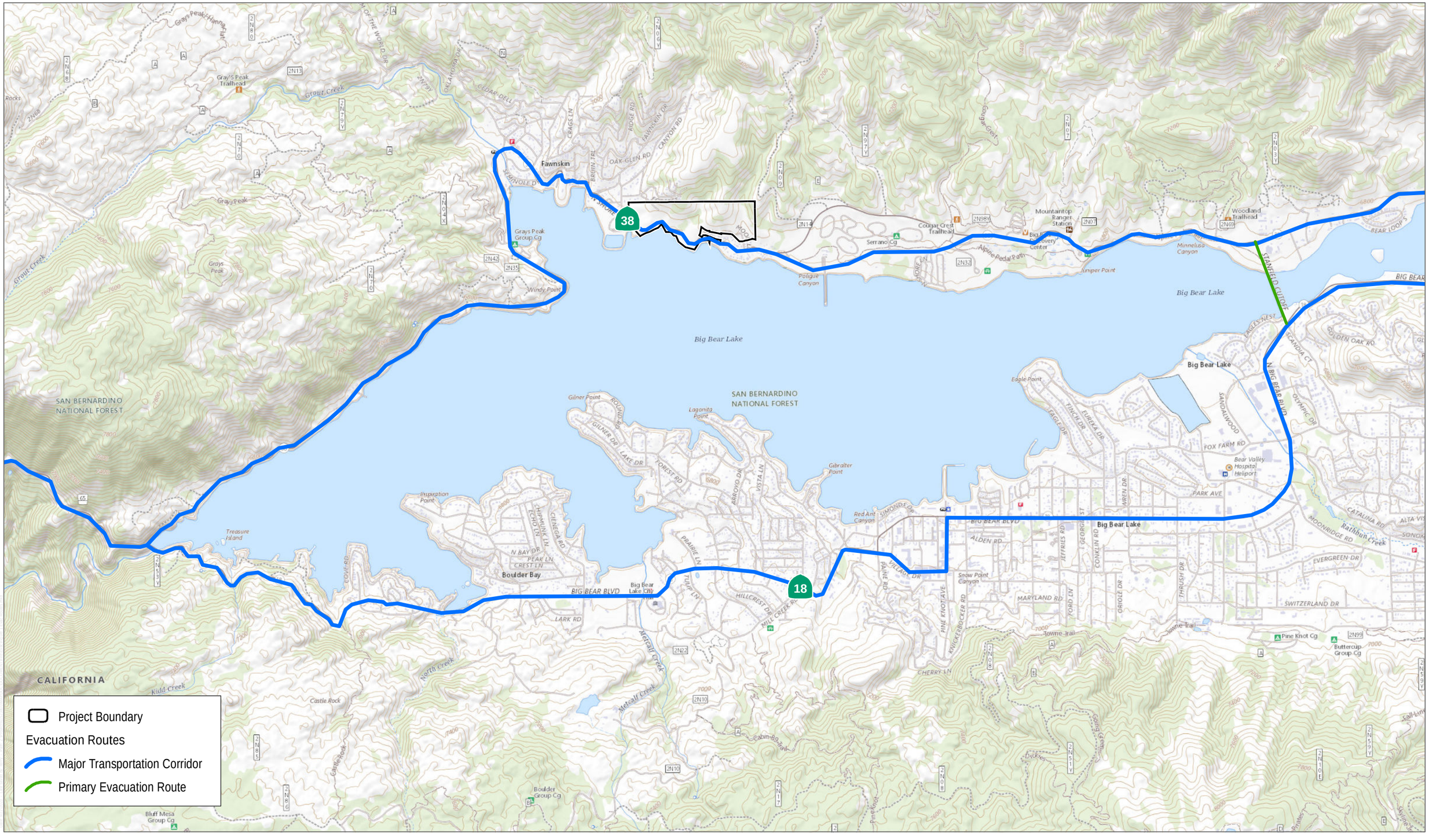
Hospitals:

Bear Valley Community Hospital
41870 Garstin Drive,
Big Bear Lake, CA 92315

Directions:
Turn left onto CA-38 W towards N Shore Ln (3 miles)
Turn right into Stanfield Cutoff (0.4 miles)
Turn right onto Big Bear Blvd (0.9 miles)
Turn right at Summit Blvd
Hospital on right

Urgent Care Facilities:

Big Bear Urgent Care
41949 Big Bear Blvd,
Big Bear Lake, CA 92315



SOURCE: BASEMAP-ESRI MAPPING SERVICE 2022

DUDEK

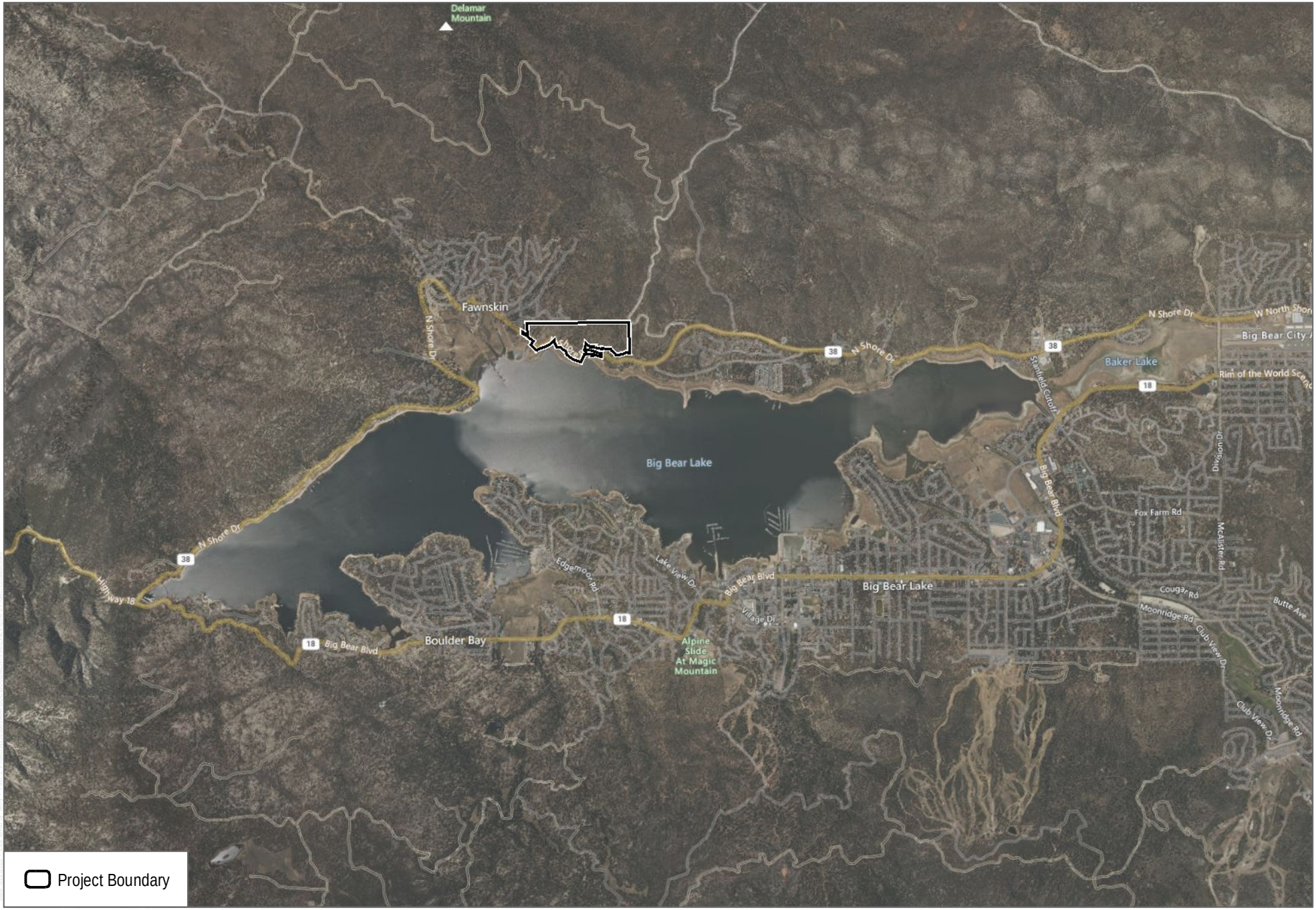
0 1,100 2,200 Feet

FIGURE 1

Evacuation Routes

Fire Evacuation Plan for the Moon Camp Project

INTENTIONALLY LEFT BLANK



SOURCE: ESRI IMAGERY SERVICE 2022; COUNTY OF SAN BERNARDINO 2022

DUDEK

0 2,000 4,000 Feet

FIGURE 2

Project Location

Fire Evacuation Plan for the Moon Camp Project

INTENTIONALLY LEFT BLANK

TENTATIVE TRACT No. 16136

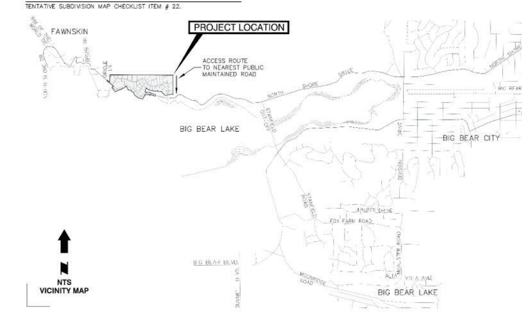
OFFICIAL USE ONLY

ADJACENT PROPERTY OWNERS

1. 0304-102-05 RICHARD L. THOMAS TRUST 6-13-97 1971 W 190TH ST. #100 TORRANCE, CA 90504 TRACT 2627-LOT 32
2. 0304-102-06 HERBERT L. LEATHERMAN P.O. BOX 6105 EL MONTE, CA 91734 TRACT 2627-LOT 33
3. 0304-102-07 SCHWARZ FAMILY TRUST 13038 LOMAS VERDES DR. POWAY, CA 92064 TRACT 2627-LOT 34
4. 0304-102-08 PAUL H. LASKY BARBARA S. LASKY P.O. BOX 310 FAWNSKIN, CA 92333 TRACT 2627-LOT 35
5. 0304-102-09 GEORGE & KATHLEEN STODDARD FAMILY TRUST TRACT 2627 LOT 36
6. 0304-102-10 JOELLA M. NEWFELD 5360 VIA MORENA YORBA LINDA, CA 92886 TRACT 2627-LOT 37
7. 0304-102-11 NORTH SHORE DRIVE LLC TRACT NO 2627 MOON CAMP SUB NO 1 LOT 38
8. 0304-102-12 ANDERSON FAMILY TRUST 4-15-04 P.O. BOX 1320 BIG BEAR LAKE, CA 92315 TRACT 2627-LOT 39
9. 0304-102-13 DOUGLAS R. CIRCLE JAN A. CIRCLE 10242 E CAMDEN CIRCLE VILLA PARK, CA 92861 TRACT 2627-LOT 40
10. 0304-102-14 JAMES A. STOVALL FAMILY TRUST (4-6-84) 2815 STONE PINE ROAD ORANGE, CA 92667 TRACT 2627-LOT 41
11. 0304-102-15 DAVID & BEVERLY RUNT REV LIV TR 4-5-94 TRACT 2627 LOT 42
12. 0304-102-16 JOHN J. MCGRATH 1113 MONTEREY MALIBU, CA 90265 TRACT 2627-LOT 43
13. 0304-102-17 MASSON TRUST 2-11-97 1988 DONNA DRIVE LAGUNA BEACH, CA 92651 TRACT 2627-LOT 44
14. 0304-102-28 JOSEPH M. PLECNIK ANNE M. PLECNIK 1880 SAN ANSILINE LONG BEACH, CA 90815
15. 0304-102-27 JOHN PLECNIK MATTHEW PLECNIK 111 JOHNSTON DRIVE BELMONT, NC 28012 TRACT 2627-LOT 47
16. 0304-102-21 MEB LLC 4 GATEHALL DRIVE IRVINE, CA 92618 TRACT 2627-LOT 48
17. 0304-102-22 CLARENCE R. YOUNG MARYANN P. YOUNG TRACT 2627 LOT 49
18. 0304-102-24 SAN BERNARDINO COUNTY SERVICE AREA 53-B 157 W FIFTH STREET SAN BERNARDINO, CA 91415
19. 0304-091-20 PLATINUM-MARIN TRUST 08-06-97 N/A
20. 0304-091-03 JOHN ROBERTS JOANNE ROBERTS 1600 N. ORANGE GROVE AVE. BOCA RATON, FL 33487
21. 0304-091-04 JAMES K. MORROW JOANNE E. MORROW 428 10TH STREET MANHATTAN BEACH, CA 90266
22. 0304-091-24 ARDASHES K. GOURDIKIAN SETA GOURDIKIAN INTER VIVOS TR-TRUST A 453 S. GRAND AVE. PASADENA, CA 91105
23. 0304-091-06 ROBERT F. SCOTT SHARON K. SKIPPER-SCOTT 16917 CALLE ESPUELA FAWNSKIN, CA 92333-0155
24. 0304-091-07 TERRANCE B. FUJIMOTO DARLYNE H. FUJIMOTO FAMILY TRUST 08/12/91 16917 CALLE ESPUELA CERRITOS, CA 90703
25. 0304-091-17 DENNIS WINDSCHEFFEL VICKI WINDSCHEFFEL 10-17-07 N/A
26. 0304-101-15 ZUEST FAMILY TRUST 01-24-05 PORTION OF TRACT 2627
27. 0304-101-16 WILLIAM J. HEANEY PATRICIA A. HEANEY 16168 BEACH BLVD. #232 HUNTINGTON BEACH, CA 92647
28. 0304-101-04 ERIC J. CROMIE LIVING TRUST 05-03-06 P.O. BOX 222 FAWNSKIN, CA 92333 TRACT 2627-LOT 4
29. 0304-101-05 WAYNE L. HANSON SHARON D. HANSON 5485 CALUMET AVENUE LA JOLLA, CA 92037 TRACT 2627-LOT 5
30. 0304-101-06 DAVE MC HENRY RICHARD MC HENRY 344 E EVERGREEN COVINA, CA 91723 TRACT 2627-LOT 6
31. 0304-101-07 JAMES J. RICE FOX FAM LIVING TRUST 638 S. LINDERO CANYON RD. SANTA BARBARA, CA 93111 #271 TRACT 2627-LOT 7
32. 0304-101-08 WELLS FARGO BANK TR 08-25-08 N/A
33. 0304-101-12 ERIC A. JENSEN LIVING TRUST 494 EL BOSQUE STREET LAGUNA BEACH, CA 92651
34. 0304-101-11 LORETTA L. GARDINER P.O. BOX 258 FAWNSKIN, CA 92333 TRACT 2627-LOT 11
35. 0304-103-01 MARLENE THURSTON TRUST 1-16-02 13620 PIONEER BLVD. FAWNSKIN, CA 92333 TRACT 2627-LOT 12
36. 0304-103-02 JILL S. HELMS 8221 MC GROARTY PLACE SUNLAND, CA 91040 TRACT 2627-LOT 13
37. 0304-103-03 JILL S. HELMS 1653 SHERNANDOAH ROAD SUNLAND, CA 91040 TRACT 2627-LOT 14
38. 0304-103-04 MICHAEL T. WALSH TRUST 11-08-06 29232 RIDGEVIEW DR. LAGUNA NIGUEL, CA 92677 TRACT 2627-LOT 15
39. 0304-103-05 CHAVARIN & ASHKAN 2007 TRUST 23937 VIA PAMILLA RESEDA, CA 91335 TRACT 2627-LOT 16
40. 0304-103-06 MICHAEL H. RIEHLE TR 01-17-01 3671 FENN ST. FAWNSKIN, CA 92333 TRACT 2627-LOT 17
41. 0304-103-07 SHSR TRUST 10-12-06 N/A TRACT 2627-LOT 18
42. 0304-103-08 WILLIAM B. HEDEKIN 1138 HARE AVE. DIAMOND BAR, CA 91789
43. 0304-261-23 UNITED STATES OF AMERICA GOVERNMENT LAND
44. 0304-251-01 UNITED STATES OF AMERICA GOVERNMENT LAND
45. 0304-021-13 UNITED STATES OF AMERICA GOVERNMENT LAND
46. 0304-231-34 CALFAM LLC 29 TERRAZA DRIVE NEWPORT BEACH, CA 92657
47. 0304-423-13 CALFAM LLC 6742 LEMON LEAF DR. NEWPORT BEACH, CA 92657 TRACT 7723-LOT 13
48. 0304-423-12 LINDA STOLL-NEUBURGER KATE NEUBURGER, TRUST 5540 ANAHEIM RD. NEWPORT BEACH, CA 92660 TRACT 7723-LOT 12
49. 0304-423-11 TERRY PAYNE JOHN L. BESSEY 39795 FLICKER DRIVE FAWNSKIN, CA 92333 TRACT 7723-LOT 11
50. 0304-423-10 JOSEPH L. FRANCUZ BARBARA FRANCUZ 817 CORONADO TERRACE LOS ANGELES, CA 90026 TRACT 7723-LOT 10
51. 0304-423-09 GREGORY J. FRAZER CARISSA D. BENNETT 1477 DWIGHT DR. GLENDALE, CA 91207 TRACT 7723-LOT 9
52. 0304-423-08 NIKOLAUS SCHOENBERGER FAMILY TRUST 4-24-00 29732 BADEN PLACE MALIBU, CA 90265 TRACT 7723-LOT 8
53. 0304-423-07 NIKOLAUS SCHOENBERGER FAMILY TRUST 4-24-00 29732 BADEN PLACE MALIBU, CA 90265 TRACT 7723-LOT 7
54. 0304-423-06 THOMAS M. BRICKLEY KIMBERY C. BRICKLEY 957 W REECE STREET SAN BERNARDINO, CA 92411 TRACT 7723-LOT 6
55. 0304-423-05 MICHAEL MC GEE LAURIE MC GEE TRACT NO 7723 LOT 5
56. 0304-423-15 JOHN P. DE LANDTSHEER JOELLE C. DE LANDTSHEER P.O. BOX 311 BIG BEAR CITY, CA 92314
57. 0304-423-14 RICHARD SHAPIRO MADONNA SHAPIRO 5053 FULTON AVENUE TOPANGA, CA 90290
58. 0304-423-03 JOSEPH A. ROACH TRACT NO 7723 LOT 3
59. 0304-215-16 JEAN GRINYER-THILL ALAN J THILL 12-26-2008 N/A
60. 0304-215-11 CHARLES H. CLINE JOAN L. CLINE P.O. BOX 275 FAWNSKIN, CA 92333
61. 0304-215-12 JONI ALLEN 14 HUGHES STREET VALENCIA, CA 91355
62. 0304-215-06 THEODORE D. WRIGHT LINDA D. WRIGHT 16189 QUARTER HORSE ROAD BAKERSFIELD, CA 93314
63. 0304-215-14 HENRICH FAMILY LIV TRUST 8-19-95 P.O. BOX 282 FAWNSKIN, CA 92333
64. 0304-215-13 CHERYL CARTER 1464 ROYAL BLVD. FAWNSKIN, CA 92333
65. 0304-215-04 GEORGE MUHAR MARIE D. MUHAR 10015 CITRUS AVE FONTANA, CA 92335
66. 0304-215-03 WHEELER FAMILY TRUST 08-19-05 4145 PORTILLA PLACE AZUSA, CA 91702
67. 0304-215-01 MARK H. KUNTZ FAMILY CREDIT SHELTER TR 31404 ALTA VISTA DRIVE REDLANDS, CA 92373
68. 0304-215-02 BRUCE KIM PATRICIA E. KIM 18080 GOLDEN LEAF LA. RIVERSIDE, CA 92504
69. 0304-082-11 LORANT LASSU JANICE LASSU 21862 HARBORBREEZE LANE TORRANCE, CA 90504
70. 0304-082-10 LORANT F. LASSU JANICE M. LASSU 21862 HARBORBREEZE LN. TORRANCE, CA 90504
71. 0304-082-23 FLORA J. BRANSON REVOCABLE TRUST 05-22-02 P.O. BOX 445 FAWNSKIN, CA 92333
72. 0304-082-01 WILLIAM C. HAZEWINKEL WILLIAM C. HAZEWINKEL 880 CANYON ROAD FAWNSKIN, CA 92333
73. 0304-205-07 KAREN S. DIGIACOMO FAWNSKIN SUB E 1/2 LOT 76
74. 0304-205-08 DANIEL J. GREENWOOD 1864 TEMPLE AVENUE CAMARILLO, CA 93012
75. 0304-205-09 CITY OF BIG BEAR LAKE P.O. BOX 1929 BIG BEAR LAKE, CA 92315
76. 0304-205-10 JOHN VANDER HORCK JOANN VANDER HORCK 5141 E CARLITA STREET FAWNSKIN, CA 92333
77. 0304-082-18 MARINA POINT DEV. ASSOC 6007 E GRANT ROAD TUCSON, AZ 85712
78. 0304-082-15 MARINA POINT DEV. ASSOC 6007 E GRANT ROAD TUCSON, AZ 85712
79. 0304-082-21 MARINA POINT DEV. ASSOC 6007 E GRANT ROAD TUCSON, AZ 85712
80. 0304-082-17 MARINA POINT DEV. ASSOC 6007 E GRANT ROAD TUCSON, AZ 85712
81. 0304-082-16 MARINA POINT DEV. ASSOC 6007 E GRANT ROAD TUCSON, AZ 85712

VICINITY MAP

TENTATIVE SUBDIVISION MAP CHECKLIST ITEM # 22.



TENTATIVE SUBDIVISION MAP CHECKLIST

1. INFORMATION DELINEATED ON MAP AS REQUIRED
2. INFORMATION DELINEATED ON MAP AS REQUIRED

3A. RECORD PROPERTY OWNER: RCK PROPERTIES, TIM WOOD, P.O. BOX 6820, BIG BEAR LAKE, CALIFORNIA 92315, (909) 866-3481

B. SUBDIVIDER: URBAN ENVIRONS, 1345 FOUNTAIN PLACE, REDLANDS, CA 92373, PH: (909) 798-4446

C. ENGINEER: HICKS & HARTWICK, INC., 37 EAST OLIVE AVE., REDLANDS, CA 92373, PH: (909) 793-2257

4. PUBLIC UTILITY INFORMATION

- ELECTRIC: BEAR VALLEY ELECTRIC CO., 42020 GARSTIN ROAD, BIG BEAR LAKE, CA. 92315, (909) 866-4678
- TELEPHONE: VERIZON, 560 BARTLETT ROAD, BIG BEAR LAKE, CA. 92315, (909) 866-3773
- GAS: SOUTHWEST GAS CO., 40844 BIG BEAR BOULEVARD, BIG BEAR LAKE, CA. 92315, (909) 866-4656
- SCHOOL DISTRICT: BEAR VALLEY UNIFIED SCHOOL DIST., P.O. BOX 1529, BIG BEAR LAKE, CA 92315, (909) 866-4631
- SEWER: COUNTY SERVICE AREA 53B, SPECIAL DISTRICTS DEPT., P.O. BOX 5004, VICTORVILLE, CA 92393, (909) 955-9885
- WATER: COUNTY SERVICE AREA 53B, SPECIAL DISTRICTS DEPT., P.O. BOX 5004, VICTORVILLE, CA 92393, (909) 955-9885
- TRASH: BIG BEAR DISPOSAL, INC., 41974 GARSTIN DRIVE, BIG BEAR LAKE, CA. 92315, (909) 866-3942
- FIRE PROTECTION: SAN BERNARDINO COUNTY FIRE DEPT., FIRE STATION NO. 49, 39188 RIM OF THE WORLD DRIVE, FAWNSKIN, CA 92333; *MOUNTAIN DISTRICT*: 301 S. STATE HIGHWAY 173, LAKE ARROWHEAD, CA 92352, (909) 337-8586; *MAILING*: P.O. BOX 130, LAKE ARROWHEAD, CA 92352
- TELEVISION: CHARTER CABLE, 41490 BIG BEAR BLVD., BIG BEAR LAKE, CA. 92315, (909) 866-3415

5. INFORMATION DELINEATED ON MAP AS REQUIRED
6. INFORMATION DELINEATED ON MAP AS REQUIRED

SCALE: 1" = 100'
CONTOUR INTERVAL = 1'
DATE OF PHOTOGRAPHY 10-25-2000
PHOTO SCALE: 1"= 300'
THIS MAP COMPILED BY PHOTOGRAMMETRIC METHODS
TOPOGRAPHIC MAP PREPARED BY: HICKS & HARTWICK, INC.

GRAPHIC SCALE
0 50 100 200 300 400
1 INCH = 100 FT.

THE BOUNDARY LINES SHOWN HEREON WERE DERIVED FROM RECORD INFORMATION INCLUDING MAPS, PLATS AND DEEDS AND DOES NOT REPRESENT A FIELD SURVEY.

7. LEGAL DESCRIPTION:
A PORTION OF THE NORTH 1/2 OF SECTION 13, TOWNSHIP 2 NORTH, RANGE 1 WEST, SAN BERNARDINO BASE AND MERIDIAN, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA.

8. INFORMATION DELINEATED ON MAP AS REQUIRED

9A. SITE AREA: APPROXIMATELY 62.45 AC. (2,720,414 SF)

B. NUMBER OF NUMBERED LOTS: 50

C. NUMBER OF LETTERED LOTS: 8 – LOT 'A': 143,306 SF. (3.40 AC.); LOT 'B': 35,717 SF. (0.82 AC.); LOT 'C': 126,418 SF. (2.90 AC.); LOT 'D': 6,000 SF.; LOT 'E': 7,617 SF.; LOT 'F': 16,198 SF.; LOT 'G': 179,544 SF. (4.12 AC.); LOT 'H': 86,301 SF. (1.98 AC.)

D. SUBDIVISION LOT DENSITY: 0.80 LOTS PER ACRE (1.24 AC / LOT)

E. TOTAL ACREAGE OF PROJECT: 62.46 AC. (2,720,880 SF)

10A. EXISTING ZONING: RL-40

B. PROPOSED ZONING: RS-20,000

11. USE OF LETTERED LOTS: LOT 'A': OPEN SPACE CONSERVATION ESMT.; LOT 'B': OPEN SPACE/NEIGHBORHOOD LAKE ACCESS; LOT 'C': H.O.A. MARINA PARKING; LOT 'D': EXISTING WELL SITE; LOT 'E': EXISTING WELL SITE; LOT 'F': EXISTING WELL SITE; LOT 'G': PRIVATE STREETS; LOT 'H': OPEN SPACE CONSERVATION ESMT.

12. NUMBER OF LINEAL FEET OF NEW STREETS: 6,982 LF

13A. EXISTING LAND USE CLASSIFICATION: RL-40

B. DEV. USES OF ADJOINING PROPERTY: NORTH: RESIDENTIAL/USFS; SOUTH: BIG BEAR LAKE; EAST: RESIDENTIAL; WEST: RESIDENTIAL

14. FRONT & BACK SETBACK LINES DELINEATED ON MAP
FRONT YARD SETBACK OF AT LEAST TWENTY-TWO (22) FEET WITH AN AVERAGE OF TWENTY-FIVE (25) FEET.
REAR YARD SETBACK OF FIFTEEN (15) FEET.
SIDE YARD SETBACK OF TEN (10) FEET ON ONE SIDE AND FIVE (5) FEET ON THE OTHER SIDE. – STREET SIDE YARD SETBACK SHALL BE TWENTY (20) FEET.
A 100 FOOT "FUEL MODIFICATION ZONE" IS ALSO DELINEATED AS REQUIRED AND IS LISTED ON THE LEGEND.

15. INFORMATION DELINEATED ON MAP AS REQUIRED
16. INFORMATION DELINEATED ON MAP AS REQUIRED

17. EXISTING EASEMENTS:
DESCRIPTIONS PER FIRST AMERICAN TITLE REPORT ORDER NUMBER: SC-415823-U.

A. RIGHTS OF THE PUBLIC OVER ANY PORTION OF SAID LAND LYING WITHIN THE BOUNDARIES OF ANY ROAD, STREET OR HIGHWAY.
(A) THE FACT THAT A PORTION OF THE PROPERTY LYING BELOW THE MEAN HIGH WATER MARK OF BIG BEAR LAKE IS SUBJECT TO FLOODING AND INUNDATION OF THE WATERS OF BIG BEAR LAKE, WHICH ARE SUBJECT TO CHANGE PERIODICALLY THROUGH THE YEAR DUE TO WEATHER CONDITIONS AND RUN OFF OF STORM WATERS AND SNOW FALL FROM ADJOINING PROPERTY.
(B) SUBJECT TO INGRESS AND EGRESS OVER THAT PORTION OF THE PROPERTY HEREIN LYING BELOW THE HIGH WATER MARK OF BIG BEAR LAKE, AND THE RIGHTS OF THE PUBLIC TO NAVIGATE AND FISH OVER THAT PORTION WITHIN THE WATERS OF BIG BEAR LAKE, IF SAME SHOULD BE FOUND TO EXIST.

B. AN EASEMENT FOR THE HEREINAFTER SET FORTH SPECIFIC PURPOSE AND INCIDENTAL PURPOSES, RECORDED IN BOOK 29, PAGE 193, OFFICIAL RECORDS.
SAID EASEMENT IS FOR ESTABLISHMENT OF A STATE HIGHWAY.
SAID EASEMENT WAS CONVEYED TO THE ESTATE OF CALIFORNIA BY SUCH DOCUMENT. (AFFECTS PARCEL NOS. 1, 3 AND 4)

17. EXISTING EASEMENTS: (CONTINUED)

C. THE EFFECT OF A CHATTEL MORTGAGE AND A DEED OF TRUST CONVEYING PROPERTY HEREIN DESCRIBED WITH OTHER PROPERTY TO SECURE AN INDEBTEDNESS IN THE ORIGINAL PRINCIPAL SUM OF $342,000.00 AND ANY OTHER AMOUNTS AND/OR OBLIGATIONS SECURED THEREBY, RECORDED JUNE 11, 1938, IN BOOK 1277, PAGE 393, OFFICIAL RECORDS; RE-RECORDED MAY 22, 1942, IN BOOK 1535, PAGE 175, OFFICIAL RECORDS; AND RE-RECORDED APRIL 18, 1946, IN BOOK 1895, PAGE 312, OFFICIAL RECORDS; AND RE-RECORDED MARCH 17, 1950, IN BOOK 2547, PAGE 221, OFFICIAL RECORDS.
DATED: *JUNE 8, 1938*
TRUSTOR: *BEAR VALLEY MUTUAL WATER COMPANY, A CORPORATION*
TRUSTEE: *PIONEER TITLE INSURANCE AND TRUST COMPANY*
BENEFICIARY: *BERKELEY BANK FOR COOPERATIVES, A CORPORATION*
BY PARTIAL RECONVEYANCE DATED NOVEMBER 24, 1967, AND RECORDED DECEMBER 27, 1968, IN BOOK 7154, PAGE 924, OFFICIAL RECORDS, A PORTION OF SAID LAND WAS RELEASED FROM THE LIEN OF SAID TRUST AND IS EXCEPTED FROM THE DESCRIPTION OF THE LAND COVERED BY THIS REPORT.
THE EFFECT OF THE RECONVEYANCE DEED DESCRIBED HEREIN, DATED MAY 5, 1971 AND RECORDED MAY 6, 1971, IN BOOK 7660, PAGE 517, OFFICIAL RECORDS.

D. AN EASEMENT FOR THE HEREINAFTER SET FORTH SPECIFIC PURPOSE AND INCIDENTAL PURPOSES, RECORDED IN BOOK 6682, PAGE 596, OFFICIAL RECORDS.
SAID EASEMENT IS FOR HIGHWAY AND ROAD PURPOSES AND WAS CONVEYED TO THE COUNTY OF SAN BERNARDINO BY SUCH DOCUMENT. (AFFECTS PARCEL NO. 1)

E. AN EASEMENT FOR THE HEREINAFTER SET FORTH SPECIFIC PURPOSE AND INCIDENTAL PURPOSES, RECORDED IN BOOK 6853, PAGE 569, OFFICIAL RECORDS.
SAID EASEMENT IS FOR DRAINAGE AND FLOWAGE AND WAS CONVEYED TO THE COUNTY OF SAN BERNARDINO BY SUCH DOCUMENT.

F. AN EASEMENT FOR THE HEREAFTER SET FORTH SPECIFIC PURPOSE AND INCIDENTAL PURPOSES RECORDED IN BOOK 7160, BOOK 701, OFFICIAL RECORDS.
SAID EASEMENT IS FOR LAKE BOTTOM DOCKS, INGRESS AND EGRESS AND RAMPS. AND WAS CONVEYED TO BIG BEAR DEVELOPMENT COMPANY, A CORPORATION BY SUCH DOCUMENT.
NOTE: REFERENCE IS MADE TO DOCUMENT IN BOOK 8447, PAGE 575, OFFICIAL RECORDS, AND IN BOOK 8463, PAGE 744, OFFICIAL RECORDS. (AFFECTS PARCEL NOS. 1, 2, 3 AND 4)

G. AN EASEMENT FOR THE HEREINAFTER SET FORTH SPECIFIC PURPOSE AND INCIDENTAL PURPOSES, RECORDED IN BOOK 7213, PAGE 858, OFFICIAL RECORDS.
SAID EASEMENT IS FOR INGRESS AND EGRESS FOR VEHICULAR AND PEDESTRIAN TRAFFIC AND TO CLEAN AND REMOVE DEBRIS OF TO ASSIST SWIMMERS OR BOATS THAT MAY BE IN DISTRESS AND OTHER SIMILAR OR RELATED PURPOSES AND WAS CONVEYED TO BEAR VALLEY MUTUAL WATER COMPANY, A CORPORATION BY SUCH DOCUMENT. (AFFECTS PARCEL NOS. 2 AND 3)

H. AN EASEMENT FOR THE HEREINAFTER SET FORTH SPECIFIC PURPOSE AND INCIDENTAL PURPOSES, RECORDED IN BOOK 9261, PAGE 1051, OFFICIAL RECORDS.
SAID EASEMENT IS FOR SANITARY SEWER PURPOSES AND WAS CONVEYED TO BIG BEAR WASTEWATER AGENCY BY SUCH DOCUMENT. (AFFECTS ALL PARCELS)

17. EXISTING EASEMENTS: (CONTINUED)

I. AN EASEMENT FOR THE HEREINAFTER SET FORTH SPECIFIC PURPOSE AND INCIDENTAL PURPOSES, RECORDED IN BOOK 9350, PAGE 1769, OFFICIAL RECORDS.
SAID EASEMENT IS FOR SEWER PIPE LINES AND APPURTENANCES AND THEREIN. WAS CONVEYED TO COUNTY OF SAN BERNARDINO ON BEHALF OF COUNTY SERVICE AREA 53, IMPROVEMENT ZONE "B" BY SUCH DOCUMENT. (AFFECTS PARCEL NOS. 1 AND 4)

J. AN EASEMENT FOR THE HEREINAFTER SET FORTH SPECIFIC PURPOSE AND INCIDENTAL PURPOSES, RECORDED IN BOOK 9350, PAGE 1772, OFFICIAL RECORDS.
SAID EASEMENT IS FOR SEWER PIPE LINES AND APPURTENANCES AND WAS CONVEYED TO THE COUNTY OF SAN BERNARDINO ON BEHALF OF COUNTY SERVICE AREA #53 IMPROVEMENT ZONE "B" BY SUCH DOCUMENT. (AFFECTS PARCEL NO. 2)

K. AN EASEMENT FOR THE HEREINAFTER SET FORTH SPECIFIC PURPOSE AND INCIDENTAL PURPOSES, RECORDED IN BOOK 9350, PAGE 1774, OFFICIAL RECORDS.
SAID EASEMENT IS FOR SEWER PIPE LINES AND APPURTENANCES AND WAS CONVEYED TO THE COUNTY OF SAN BERNARDINO ON BEHALF OF COUNTY SERVICE AREA 53 IMPROVEMENT ZONE B BY SUCH DOCUMENT. (AFFECTS PARCEL NO. 3)

L. AN EASEMENT FOR THE HEREINAFTER SET FORTH SPECIFIC PURPOSE AND INCIDENTAL PURPOSES, RECORDED IN BOOK 9350, PAGE 1772, OFFICIAL RECORDS.
SAID EASEMENT IS FOR SEWER PIPELINES AND APPURTENANCES AND WAS CONVEYED TO THE COUNTY OF SAN BERNARDINO ON BEHALF OF COUNTY SERVICE AREA 53 IMPROVEMENT ZONE "B" BY SUCH DOCUMENT. (AFFECTS PARCEL NOS. 1 AND 4)

M. AN EASEMENT FOR THE HEREINAFTER SET FORTH SPECIFIC PURPOSE AND INCIDENTAL PURPOSES, RECORDED IN BOOK 9498, PAGE 51, OFFICIAL RECORDS.
SAID EASEMENT IS FOR SEWER PIPE LINES AND APPURTENANCES AND WAS CONVEYED TO THE COUNTY OF SAN BERNARDINO ON BEHALF OF COUNTY SERVICE AREA 53 IMPROVEMENT ZONE "B" BY SUCH DOCUMENT. (AFFECTS PARCEL NO. 4)

N. AN EASEMENT FOR THE HEREINAFTER SET FORTH SPECIFIC PURPOSE AND INCIDENTAL PURPOSES, RECORDED JUNE 17, 1981, INSTRUMENT NO. 81-132249, OFFICIAL RECORDS.
SAID EASEMENT IS FOR VEHICULAR AND PEDESTRIAN, INGRESS, EGRESS, ROAD AND PUBLIC UTILITY PURPOSES AND WAS CONVEYED TO ROBERT F. MCNATT, AN UNMARRIED MAN BY SUCH DOCUMENT. (AFFECTS PARCEL NO. 1 AND 4)

O. AN EASEMENT FOR THE HEREINAFTER SET FORTH SPECIFIC PURPOSE AND INCIDENTAL PURPOSES, RECORDED JUNE 24, 1987, INSTRUMENT NOS. 87-214864 AND 87-214867, OFFICIAL RECORDS.
SAID EASEMENT IS FOR INGRESS AND EGRESS FOR ROAD AND PUBLIC UTILITIES.

18-23. INFORMATION DELINEATED ON MAP AS REQUIRED
24. PROJECT SHALL BE FOR **"LOT SALES ONLY"**
25. ALL EXISTING TREES DELINEATED ON MAP.

SURVEYOR'S NOTES

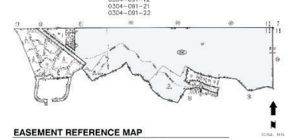
BASIS OF BEARINGS:
THE NORTH LINE OF THE W 1/2 OF THE NE 1/4 OF SEC. 13, T2N, R1W, BEARING N89~39'30"W PER TRACT 7723, MB 100/87-88.

GENERAL NOTE

1. LOTS 27,41, AND 42 MAY REQUIRE ACCESS ACROSS THE ACOE/CDFG JURISDICTIONAL BOUNDARIES.
2. TOTAL NUMBER OF TREES ON ENTIRE MOONCAMP PARCEL: 2,760
3. NUMBER OF TREES REMOVED TO BUILD ROAD WITHIN TRACT: 345

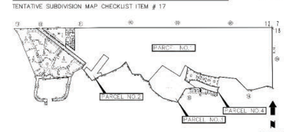
APN INDEX MAP

TENTATIVE SUBDIVISION MAP CHECKLIST ITEM # 1.
ASSESSOR'S PARCEL NUMBER: 0304-082-04, 0304-091-12, 0304-091-21, 0304-091-22



EASEMENT REFERENCE MAP

TENTATIVE SUBDIVISION MAP CHECKLIST ITEM # 17



LEGEND

- MANHOLE
- ROAD MARKER
- FIRE HYDRANT
- VALVE
- SIGN
- POWER POLE
- GUY WIRE
- STREET LAMP
- RETAINING WALL
- TANK
- EXISTING TREE OF RELATIVE SIZE
- BRUSH LINE
- CONTROL POINT
- GROUND NOT VISIBLE
- CUT SLOPE (1 1/2 :1 OR LESS)
- FILL SLOPE (1 1/2 :1 OR LESS)
- ROCKS
- CHAIN LINK FENCE
- WOOD FENCE
- EDGE OF PAVEMENT
- BUILDING OUTLINE
- FOUND MONUMENT
- BALD EAGLE PERCH
- PROPERTY LINE AND HIGH WATER LINE PER RECORD OF SURVEY (RS 3/103-110) SEPTEMBER 1938 – ELEV.=6742.60
- ACOE/CDFG JURISDICTIONAL BOUNDARIES
- RUBBER BOA AREA (100' WIDTH)
- STORM DRAIN EASEMENT
- STORM DRAIN STRUCTURE
- STORM DRAIN INLET
- CULVERTS (PRELIMINARY SIZE SHOWN)
- STORM DRAIN IDENTIFICATION NUMBER

LINE TABLE

LINE	BEARING	LENGTH
L1	N53°42'22"W	33.21'
L2	N13°02'39"E	39.09'
L3	N26°57'44"W	16.95'
L4	N21°14'56"E	52.80'
L5	N55°39'15"W	85.15'
L6	N24°05'44"E	46.95'
L7	N13°49'47"E	20.05'
L8	N89°39'39"W	93.08'
L9	N00°02'12"W	51.27'
L10	N88°42'49"W	101.80'
L11	N73°29'48"W	82.84'
L12	N07°22'16"E	76.93'
L13	N46°23'15"E	95.71'
L14	N67°19'24"W	240.63'
L15	N66°02'37"E	170.53'
L16	N33°16'54"W	104.54'
L17	N33°16'54"W	53.77'
L18	N33°16'54"W	50.77'
L19	N70°48'45"E	117.73'
L20	N04°56'40"W	308.82'
L21	N85°03'20"E	27.00'
L22	N40°29'19"W	167.41'
L23	N71°22'41"E	96.68'
L24	N80°53'54"W	146.64'
L25	N28°02'13"E	173.57'
L26	N56°43'06"E	147.68'
L27	N21°20'25"W	29.13'
L28	N21°20'25"W	89.79'
L29	N21°20'25"W	118.91'
L30	N68°39'35"E	51.71'
L31	N46°36'21"E	110.12'
L32	N67°48'44"W	228.65'
L33	N68°39'35"E	74.42'
L34	N01°15'43"W	28.99'
L35	N76°06'21"W	41.29'
L36	N41°58'57"W	79.53'
L37	N78°30'45"W	81.43'
L38	N14°19'13"W	33.35'
L39	N87°41'36"W	54.98'

WATER QUALITY MANAGEMENT PLAN REFERENCE

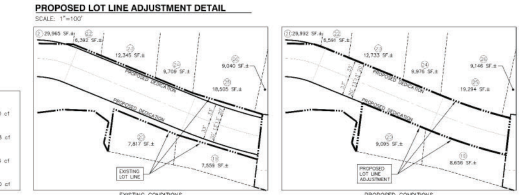
- INDICATES WATER QUALITY MANAGEMENT PLAN REQUIRED FOR INDIVIDUAL HOUSE CONSTRUCTION AT THE TIME OF BUILDING PERMIT ISSUANCE.
- INDICATES WATER QUALITY MANAGEMENT PLAN APPROXIMATE BMP TREATMENT CONTROL LOCATION WITH BMP AREA, TREATMENT CONTROL VOLUME, AND TREATMENT CONTROL FLOW RATE.
TREATMENT CONTROL INSTALLED WITH STREET IMPROVEMENT CONSTRUCTION.

WATER QUALITY TREATMENT CONTROL TABLE

	AREA	TREATMENT FLOWRATE	TREATMENT VOLUME
A	3.5 ac	–	3,827 cf
B	9.6 ac	–	10,900 cf
C	5.4 ac	–	6,657 cf
D	1.3 ac	–	2,015 cf
E	5.0 ac	–	7,140 cf
F	2.1 ac	–	2,778 cf
G	2.8 ac	–	3,214 cf
H	1.0 ac	–	4,000 cf

PROPOSED LOT LINE ADJUSTMENT DETAIL

SCALE: 1"=100'



CURVE TABLE

CURVE	R	L
A	20.00'	30.64'
B	20.00'	30.81'
C	300.00'	172.84'
D	150.00'	230.04'
E	500.00'	145.36'
F	500.00'	245.10'
G	400.00'	325.56'
H	250.00'	352.01'
I	27.00'	42.41'
J	27.00'	42.41'
K	350.00'	463.68'
L	300.00'	116.27'
M	200.00'	175.68'
N	150.00'	346.53'
O	250.00'	146.40'
P	39.00'	48.70'
Q	40.00'	175.62'
R	NOT USED	
S	600.00'	113.31'
T	180.00'	214.05'
U	450.00'	220.50'
V	150.00'	285.27'
W	150.00'	139.19'
X	200.00'	207.90'
Y	213.00'	211.76'
Z	187.00'	194.38'
AA	20.00'	30.48'
AB	20.00'	31.42'
AC	180.00'	127.62'
AD	NOT USED	
AE	400.00'	200.23'
AF	175.00'	342.25'
AG	170.00'	194.59'
AH	900.00'	134.64'
AI	813.00'	44.01'

1. ASSESSOR'S PARCEL NO: 0304-082-04, 0304-091-12, 0304-091-21, 0304-091-22
2. TRACT NUMBER: TRACT No. 16136
3. APPLICANT/ REPRESENTATIVE: URBAN ENVIRONS, 1345 FOUNTAIN PLACE, REDLANDS, CA 92373, PH: (909) 798-4446
4. RECORDED PROPERTY OWNERS: RCK PROPERTIES, TIM WOOD, P.O. BOX 6820, BIG BEAR LAKE, CALIFORNIA 92315, (909) 866-3481
5. MAP PREPARER: HICKS & HARTWICK, INC., 37 EAST OLIVE AVE., REDLANDS, CA 92373, PH: (909) 793-2257
6. MAP PREPARATION DATE: MAY 10, 2005
7. REVISION DATES: AUG 24, 2005; NOV 09, 2005; JAN 25, 2007; JULY 31, 2007; OCT 10, 2007; NOV 06, 2007; DEC 06, 2007; JAN 27, 2009; JUN 18, 2009; AUG 20, 2009; FEB 01, 2010; JUL 23, 2010; APR 03, 2017

UNDERGROUND SERVICE ALERT

SECTION 4216/4217 OF THE GOVERNMENT CODE REQUIRES A DIG ALERT IDENTIFICATION NUMBER BE ISSUED BEFORE A "PERMIT TO EXCAVATE" WILL BE VALID. FOR YOUR DIG ALERT I.D. NUMBER CALL UNDERGROUND SERVICE ALERT TOLL FREE 1-800-422-4133 TWO WORKING DAYS BEFORE YOU DIG.

REGISTERED PROFESSIONAL ENGINEER MATTHEW C. HICKS No. 63494 CIVIL STATE OF CALIFORNIA

MATTHEW C. HICKS • RCE 63494 DATE
Hicks & Hartwick, Inc.
CIVIL ENGINEERS - LAND SURVEYORS
37 East Olive Avenue, Suite C
REDLANDS, CALIFORNIA
(909) 793-2257

FIELD BOOK REF.

MARK	REVISIONS	APPR	DATE
△	ADD LEFT TURN POCKETS AT ENTRIES & BIKE LANE		08/07/18
△	CHANGE PROPOSED STREETS TO PRIVATE (LOT 'G')		08/14/17
△	UPDATE WQMP DATA BASED ON PRELIMINARY WQMP		03/09/17
△	REMOVED LOT 'G' RESERVOIR SITE, NOT NECESSARY UNDER CURRENT WATER SERVICE PROPOSAL		06/01/16

COUNTY OF SAN BERNARDINO
DESIGNED BY AMD
DRAWN BY AMD
CHECKED BY JWH
RECOMMENDED BY
APPROVED BY
DATE
DATE

TENTATIVE TRACT No. 16136
POR. N 1/2 SEC 13, T2N, R1W, S.B.M.
FAWNSKIN, CALIFORNIA

W. O. NO.
ROAD NO.
FILE NO.
SHEET 1 OF 1

SOURCE: HICKS & HARTWICK, INC.

DUDEK

FIGURE 3

Project Site Plan

INTENTIONALLY LEFT BLANK

Register to Receive Emergency Alerts

San Bernadino County utilizes the Telephone Emergency Notification System for its Community Emergency Notification System (TENS). TENS is a mass communications hub platform that allows the County to provide secure, reliable, and relevant information to residents in real-time. The County automatically registers landline phones, with updates every six months. Residents of the Moon Camp Project are encouraged to register their cell phones to receive emergency text messages. Additionally, residents can download the San Bernadino Ready App (SB Ready) which provides evacuation alerts and other emergency preparedness resources. In the event of a wildfire threating the Project site, the Incident Command (IC) or San Bernadino County Fire Department (SBCFD) contact/coordinate with the San Bernadino County Sheriff's Department (SBCSD) to release emergency communications to affected populations. The SBCSD has the responsibility to release an emergency notification to affected population via the TENS system or Ready SB app. Therefore, residents of the Moon Camp Project are strongly advised to register all business land lines, mobile phone numbers and email addresses with Reverse 9-1-1, TENS, and the SB Ready (https://sbcfire.org/alertwarning/) alert systems in order to receive emergency evacuation instructions. The occupants of Moon Camp Project are part of the greater Big Bear Lake-San Bernadino media market and the media outlets will also be a good source of information, via television and radio, on overall emergency situations and how occupants should respond. In addition, the San Bernadino Emergency Alert System (EAS) is county-wide and broadcasts emergency information via four radio stations: KFRG 95.1 FM, KHWY 98.9 FM, KZXY 102.3 FM, and 107.7 FM. The following television stations will provide information during an emergency:

- ABC7 - https://abc7.com/
- NBC4 - https://www.nbclosangeles.com/
- KTLA - https://ktla.com/
- FOX LA - http://www.foxla.com/

Social media provides another outlet for news:

City of Big Bear Lake

- https://twitter.com/CityofBBL

San Bernardino County Sheriff Department

- https://twitter.com/sbcountysheriff
- https://www.facebook.com/sbcountysheriff

San Bernadino County Fire District

- https://twitter.com/sbcountyfire
- https://www.facebook.com/SanBernardinoCountyFire

Get Involved in Community Readiness

Residents of Moon Camp Project are encouraged to obtain Community Emergency Response Team (CERT) training through the San Bernadino County Fire Office of Emergency Services' (OES) Fire Corps CERT program. The Owners/Property Manager will organize annual evacuation public outreach for all residents as well as maintain a fire safe page on the Project's website, including this Wildfire Evacuation Plan and links to important preparedness information. This information will be made available to all occupants of the Project.

This Wildfire Evacuation Plan is prepared specifically for the Moon Camp Project and focuses on wildland fire evacuations, although many of the concepts and protocols will be applicable to other emergency situations. Ultimately, this WEP should be used by residents for awareness of evacuation approaches during wildfires and other similar emergencies. It is important for residents to understand the importance of being prepared, so if/when the time comes where evacuation is necessary, they will be able to calmly implement their evacuation plan. Some actions residents can take in advance include:

- Follow the "Ready, Set, Go!" model developed for wildfire evacuations.
    - Moon Camp should encourage residents to create an individual evacuation plan, and share it with all members of the household.
    - All residents should know the available evacuation routes, stay informed and follow directions provided by credible sources.
    - No residents should rely on navigation apps that may inadvertently lead them toward an approaching fire.
    - All residents should be encouraged to prepare a car emergency kit, including cell phone charger, flashlight, jumper cables, water, and food.

Sample emergency preparedness resources available to the Moon Camp Project residents are provided in Appendices A-1 through A-2), and occupants are encouraged to become familiar with the concepts detailed at the following websites:

1. "Ready, Set, Go!" Personal Wildland Fire Action Guide:

   https://www.readyforwildfire.org/prepare-for-wildfire/ready-set-go/
2. Red Cross Emergency Planning:

   http://www.redcross.org/get-help/how-to-prepare-for-emergencies/make-a-plan
3. Hazardous Materials Emergency Preparedness:

   https://www.ready.gov/hazardous-materials-incidents
4. Building a disaster kit:

   http://www.redcross.org/get-help/prepare-for-emergencies/be-red-cross-ready/get-a-kit

5. FEMA Ready Business How-To Guide:

https://www.ready.gov/sites/default/files/2020-04/ready_business_how-to-guide.pdf

Evacuation Plan Purpose and Limitations

Wildfires and other emergencies are often fluid events and the need for evacuations are typically determined by on-scene first responders or by a collaboration between first responders and designated emergency response teams, including OEM and the IC established for larger emergency events. As such, and consistent with all emergency evacuation plans, this WEP is to be considered a tool that supports existing pre-plans and provides for occupants and visitors who are familiar with the evacuation protocol, but this WEP is subservient to emergency event-specific directives provided by agencies managing the event.

1 Introduction

This Wildfire Evacuation Plan (WEP) was prepared based on the San Bernadino County Emergency Operations Plan (EOP) (San Bernadino County Fire OES, 2018). The format of this WEP is also consistent with the recommendations of the Emergency Support Function 16, Evacuation, of the County EOP. A complete copy of San Bernadino County's EOP can be downloaded from the respective links below:

San Bernadino County EOP:

https://www.sbcounty.gov/uploads/SBCFire/documents/OES/2018_EOP_Update.pdf

Evacuation is a process by which people are moved from a place where there is immediate or anticipated danger, to a place of safety, and offered appropriate temporary shelter facilities. When the threat to safety is gone, evacuees are able to return to their normal activities, or to make suitable alternative arrangements. The overarching goal of evacuation planning is to maximize the preservation of life while reducing the number of people that must evacuate and the distance, they must travel to seek safe refuge. The purpose of the County Emergency Operations Plan is to provide an overview of evacuation functions, agency roles and responsibilities, and overall guidelines for the evacuation of people and animals from hazardous areas to areas of safety in incidents with and without warning (San Bernadino County OES, 2018).

This Wildfire Evacuation Plan will outline strategies, procedures, recommendations, and organizational structures that can be used to implement a coordinated evacuation effort in the case of a wildfire emergency effecting the Moon Camp Project. It is noted, that the on-set of a wildfire or other emergency is generally unplanned and more often than not, occupants and visitors will be faced with decisions that need to be made quickly and determined by on-scene first responders or by a collaboration between first responders and designated emergency response teams. Therefore, this Wildfire Evacuation Plan is to be considered a tool that supports existing pre-plans and provides for occupants who are familiar with the evacuation protocol but is subservient to emergency event-specific directives provided by agencies managing the event.

1.1 Project Description

The proposed 62.43-acre Moon Camp project site is located on the north shore of Big Bear Lake, in the unincorporated community of Fawnskin, County of San Bernardino. The Project proposes to construct 50 single family dwelling units with two access points to State Route 38 (SR-38)/North Shore drive.

1.2 Applicable Regulations, Standards and Planning Tools

1.2.1 Federal

1.2.1.1 Disaster Mitigation Act

The Disaster Mitigation Act of 2000 requires that a state mitigation plan, as a condition of disaster assistance, add incentives for increased coordination and integration of mitigation activities at the state level through the establishment of requirements for two different levels of state plans: "Standard" and "Enhanced." States that develop an approved Enhanced State Plan can increase the amount of funding available through the Hazard Mitigation Grant Program. The Disaster Mitigation Act also established a new requirement for local mitigation plans.

1.2.1.2 National Incident Management System (NIMS)

The NIMS guides all levels of government, nongovernmental organizations and the private sector to work together to prevent, protect against, mitigate, respond to and recover from incidents. NIMS provides community members with a shared vocabulary, systems and processes to successfully deliver the capabilities described in the National Preparedness System. The National Preparedness System is a Presidential Policy Directive establishing a common goal to create a secure and resilient nation associated with prevention, protection, mitigation, response and recovery to address the greatest risks to the nation. One core area is fire management and suppression.

NIMS defines operational systems that guide how personnel work together during incidents.

1.2.1.3 Pet Evacuation and Transportation Standards Act

The Pets Evacuation and Transportation Standards Act of 2006 amends the Stafford Act, and requires evacuation plans to take into account the needs of individuals with household pets and service animals, prior to, during, and following a major disaster or emergency.

1.2.2 State

1.2.2.1 Fire Hazard Severity Zones

To assist each fire agency in addressing its responsibility area, California Department of Forestry and Fire Protection (CAL FIRE) uses a severity classification system to identify areas or zones of severity for fire hazards within the state. CAL FIRE is required to map these zones for State Responsibility Areas (SRA) and identify Very High Fire Hazard Severity Zones (VHFHSZ) for Local Responsibility Areas (LRA). The Project is designated as a VHFHSZ within an SRA.

1.2.2.2 California Wildland-Urban Interface Code

On September 20, 2005, the California Building Standards Commission approved the Office of the State Fire Marshal's emergency regulations amending the California Building Code (CBC) (California Code of Regulations [CCR] Title 24, Part 2). Section 701A of the CBC includes regulations addressing materials and construction methods for exterior wildfire exposure and applies to new buildings located in State Responsibility Areas or Very High Fire Hazard Severity Zones in Local Response Areas.

1.2.2.3 California Fire Code

The 2022 California Fire Code (CCR Title 24, Part 9) establishes regulations to safeguard against the hazards of fire, explosion, or dangerous conditions in new and existing buildings, structures, and premises. The Fire Code also establishes requirements intended to provide safety for and assistance to firefighters and emergency responders during emergency operations. The provisions of the Fire Code apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal, and demolition of every building or structure throughout California. The Fire Code includes regulations regarding fire-resistance-rated construction, fire protection systems such as alarm and sprinkler systems, fire services features such as fire apparatus access roads, means of egress, fire safety during construction and demolition, and wildland-urban interface areas. The County has adopted the 2022 California Fire Code as Chapter 8.16, as amended, including appendices addressing fire-flow requirements for buildings.

1.2.2.4 California Emergency Services Act

The California Emergency Services Act (California Government Code §8550, et seq.), provides for the creation of an Office of Emergency Services, assign and coordinate functions and duties to be performed during an emergency, facilitate mutual aid, and assign resources (including manpower and facilities) throughout the state for dealing with any emergency that may occur.

1.2.2.5 California Office of Emergency Services

The California Office of Emergency Services (OES) is responsible for the coordination of overall state agency response to disasters. Assuring the state's readiness to respond to, recover from all hazards and assisting local governments in their emergency preparedness, response, recovery and mitigation.

1.2.2.5.1 Standardized Emergency Management System (SEMS)

SEMS is the cornerstone of California's emergency response system and the fundamental structure for the response phase of emergency management. The system unifies all elements of California's emergency management community into a single integrated system and standardizes key elements. SEMS incorporates:

- Incident Command System (ICS) - A field-level emergency response system based on management by objectives

- Multi/ Inter-agency coordination - Affected agencies working together to coordinate allocations of resources and emergency response activities

- Mutual Aid - A system for obtaining additional emergency resources from non-affected jurisdictions.

- Operational Area Concept - County and its sub-divisions to coordinate damage information, resource requests and emergency response.

1.2.2.6 Attorney General Guidance

The California Office of the Attorney General issued guidance (Guidance) outlining best practices for analyzing and mitigating wildfire impacts of development projects under the California Environmental Quality Act (CEQA) (October 2022). The Guidance is intended to help local governments' evaluation and approval considerations for development projects in fire-prone areas, and to help project design in a way that minimizes wildfire ignition and incorporates emergency access and evacuation measures. Importantly, the Guidance does not impose additional legal requirements on local governments, nor does it alter any applicable laws or regulations.

The Guidance states that evacuation modeling and planning should be required for all projects located in HFHSZ/ VHFHSZ that present an increased risk of ignition and/or evacuation impacts. It further states that local jurisdictions should require evacuation modeling and planning to be developed prior to project approval to provide maximum flexibility in design modifications necessary to address wildfire risks and impacts. The Project is in an area designated as a VHFHSZ within a SRA and is adjacent to open space areas, which is why this Wildfire Evacuation Plan was prepared for the Project and includes the analysis of several evacuation scenarios, including existing and with Project conditions.

The Guidance further states that evacuation modeling and analysis must augment existing information when necessary to include adequate analysis of the following:

- Evaluation of the capacity of roadways to accommodate project and community evacuation and simultaneous emergency access. Existing and future roadway capacities are analyzed in Section 4 of this Evacuation Plan.

- Assessment of the timing for evacuation. Analysis of evacuation timing is detailed in Section 4.1.

- Identification of alternative plans for evacuation. Alternative plans for evacuation would be feasible due to the high ignition resistance level of Project structures.

- Evaluation of the Project's impacts on existing evacuation plans. Existing evacuation plans do not exist for the area. The Project would utilize primary evacuation routes that would be available to other evacuees. This Evacuation Plan is based on the County's Emergency Operations Plan.

- Consideration of the adequacy of emergency access, including the Project's proximity to existing fire services and the capacity of existing services. Emergency access is provided that is consistent with the fire code requirements.

- Traffic modeling to quantify travel times under various likely scenarios. This Wildfire Evacuation Plan conducted simulations using Vissim, a microscopic, multimodal traffic flow modeling software used to simulate different traffic conditions. In Vissim simulations, roadway capacity is accounted for and each vehicle in the traffic system is individually tracked through the model and comprehensive measures of effectiveness, such as average vehicle speed and queueing, are collected on every vehicle during each 0.1-second of the simulation.

In consideration of the above and that there are currently no established thresholds for determining whether evacuation times are safe, the AG Guidance encourages local jurisdictions to develop thresholds of significance for evacuation times based on community-wide standards. Any conclusion that an increase in evacuation times is a less than significant impact should be based on a threshold of significance that reflects community-wide goals and standards. Thresholds should also consider consistency with an adopted emergency operations or evacuation plan, a safety element updated to integrate wildfire and evacuation concerns, or recommendations developed by CAL FIRE relating to safety of subdivisions. The Project also has the potential to minimize on-road traffic when it is considered necessary and/or safer by temporarily providing refuge on-site in protected structures, which offers a contingency not available to all communities/developments and assists in providing flexibility and options for emergency managers.

At the time this WEP was prepared, there are no established thresholds for evacuation times for this community or any California community to the knowledge of the authors. This is primarily because every location and fire scenario are unique. While it may take one community 20 minutes to evacuate safely, it is not a valid assumption to consider a 3-hour evacuation for another community as unsafe. The 3-hour evacuation can be very safe while the 20-minute evacuation may be unsafe due to the conditions and exposures along the evacuation routes. Therefore, the Project does not utilize a quantitative threshold, but does compare its evacuation times with that of other evacuation plans relying on the FEMA 90-minute timeframe as a reasonable timeframe for most communities to evacuate. Accordingly, as detailed in Section 4, under the most conservative scenario, the Project would evacuate in 25 minutes, and changes in evacuation times are minor for Land Use Areas A through C, with 8-, 5-, and 1-minute increases in evacuation time with the proposed Project, respectively.

1.2.3 Local

1.2.3.1 San Bernadino County Multi-Jurisdictional Local Hazard Mitigation Plan

The purpose of the County's Multi-Jurisdictional Local Hazard Mitigation Plan (San Bernadino County, 2022) is to identify the County's hazards, review and assess past disaster occurrences, estimate the probability of future occurrences, and set goals to mitigate potential risks to reduce or eliminate long-term risk to people and property from natural and human-made hazards. An important San Bernardino County Multi-Jurisdictional Hazard Mitigation Plan component is the Community Emergency Response Team (CERT), which educates community members about disaster preparedness and trains them in basic response skills, including fire safety.

1.2.3.2 San Bernadino County Emergency Operations Plan

The 2018 San Bernadino County Emergency Operations Plan (EOP) describes a comprehensive emergency management system that provides for a planned response to disaster situations associated with natural disasters, technological incidents, terrorism, and nuclear-related incidents. It delineates operational concepts relating to various emergency situations, identifies components of the Emergency Management Organization, and describes the overall responsibilities for protecting life and property and providing for the overall well-being of the population. The plan also identifies the sources of outside support that might be provided (through mutual aid and specific statutory authorities) by other jurisdictions, state and federal agencies, and the private sector.

1.2.3.3 San Bernadino County Fire Code

The San Bernadino County Fire Code consists of Title 2, Division 3, Chapter 1, Sections 23.0101 through 23.011, which adopts the 2022 California Fire Code with some modifications, and applicable sections of the CCR. Provisions of the California Fire Code are described under State Regulations, above.

1.2.3.5 San Bernadino County Building Code

The County's Building Code (Title 6, Division 3, Sections 63.0101 through 63.0105) are intended to regulate the construction of applicable facilities and encompasses (and formally adopts) associated elements of the California Building Code. Specifically, this includes regulating the "regulating the erection, construction, enlargement, alteration, repair, moving, removal, demolition, conversion, occupancy, use, height, area and maintenance of all structures and certain equipment therein."

1.2.3.6 San Bernardino County Fire Hazard Abatement (FHA) Program

To enhance wildfire prevention efforts, the San Bernardino County Fire Hazard Abatement (FHA) Program enforces fire hazard regulations outlined in San Bernardino County Code Section 23.0301–23.0319. The primary goal of this program is to proactively establish defensible space and reduce or remove flammable materials on properties, thus minimizing the risk of fires in communities.

Throughout the year, the Fire Hazard Abatement Program conducts property surveys to identify potential fire hazards. Once hazards are identified, property owners are sent notices to address the hazards within 30 days. Failure to comply may result in citations, penalties, and/or fees imposed by the County. The program is available year-round to respond to complaints in both unincorporated areas and contracting Cities and Fire Districts. The Moon Camp Project is within the San Bernadino County Fire District's Mountain Region, which receives one survey during the summer.

2 Background

This Moon Camp Project Wildfire Evacuation Plan was prepared based on the San Bernadino County Emergency Operations Plan (EOP).

To establish a framework for implementing well-coordinated evacuations, the San Bernadino County Fire District, like most California emergency operations agencies, has adopted evacuation procedures in accordance with the State of California's Standardized Emergency Management System (SEMS) and the National Incident Command System (NIMS). Large-scale evacuations are complex, multi-jurisdictional efforts that require coordination between many agencies and organizations. Emergency services and other public safety organizations play key roles in ensuring that an evacuation is effective, efficient, and safe.

Evacuation is a process by which people are moved from a place where there is immediate or anticipated danger, to a safer place, and offered temporary shelter facilities. When the threat passes, evacuees are able to return to their normal activities, or to make suitable alternative arrangements.

Evacuation during a wildfire is not necessarily directed by the fire agency, except in specific areas where fire personnel may enact evacuations on-scene. The San Bernadino County Sheriff's Department (SBCSD) would be the primary law enforcement agency responsible for evacuations within the County. As detailed in the County's EOP, SBCSD would staff the Law Enforcement Branch, which manages the Evacuation & Reentry Unit. If the evacuation requires coordination with other jurisdictions, the County Sheriff's Department Operations Center (DOC) will coordinate evacuation and re-entry activities and overall San Bernadino County Sheriff's Department emergency response. During any evacuation event that exceeds normal SBCSD capacity, the County's Operational Area (OA) 's Emergency Operations Center (EOC) will be activated. In the event the EOC is activated, the EOC Law Enforcement Branch will activate the Evacuation Re-Entry Unit to coordinate the countywide evacuation and re-entry functions. Incident information and resource needs will be communicated from the Sheriff's DOC to the OA EOC Law Enforcement Branch.

The County Sheriff's DOC works closely with other organizations including SBCFD, with the DOC being in charge of coordinating SBCFD activities. Additionally, the Law Enforcement branch will link the OA EOC to many resources including the Sheriff's DOC, IC for incidents under the management of law enforcement services, as appropriate, Evacuation teams, Shelters, Transportation agencies, and other Supporting agencies.

Every evacuation scenario will include some level of unique challenges, constraints, and fluid conditions that require interpretation, fast decision making, and alternatives. For example, one roadway incident that results in blockage of evacuating vehicles may require short-term or long-term changes to the evacuation process. Risk is considered high when evacuees are evacuating late, and fire encroachment is imminent. This hypothetical scenario highlights the importance of continuing to train responding agencies, model various scenarios, educate the public, provide contingency plans, and take a very conservative approach to evacuation decision timelines.

Equally as important, the evacuation procedures should be regularly updated with lessons learned from actual evacuation events, including the Old Fire in 2003. The authors of this Wildfire Evacuation Plan

recommend that occasional updates are provided, especially following lessons learned from actual incidents, as new technologies become available that would aid in the evacuation process, and as changing landscapes and development patterns occur within and adjacent to the Project site that may impact how evacuation is accomplished. This Moon Camp Project Wildfire Evacuation Plan is consistent with the County evacuation planning standards and can be integrated into a county or regional evacuation plan and other pre-plans when and if the area officials and stakeholders (CAL FIRE, SBCFD, OES, SBCSD, and others) complete one.

As demonstrated during large and localized evacuations occurring throughout San Bernadino County historically, an important component to successful evacuation is early assessment of the situation and early notification via managed evacuation declarations. The County utilizes early warning and informational programs to help meet these important factors. Among the methods available to citizens for emergency information are TENS, a mass communications hub platform that allows the County to provide secure, reliable, and relevant information to residents in real-time, the Ready SB app, in addition to radio, television, social media/internet, neighborhood patrol car or County Sheriff patrol car, and aerial public address notifications. The County instituted this regional notification system that is able to send telephone notifications to occupants and businesses within the County impacted by, or in danger of being impacted by, an emergency or disaster. This system, called TENS, is used by emergency response personnel to notify homes and businesses at risk with information on the event and/or actions (such as evacuation, shelter-in-place, gas leak, missing person, etc.) they are advised to implement. The system utilizes the region's 9-1-1 database, provided by the local telephone company(ies), and thus is able to contact landline telephones whether listed or unlisted. It is TTY/TDD capable.

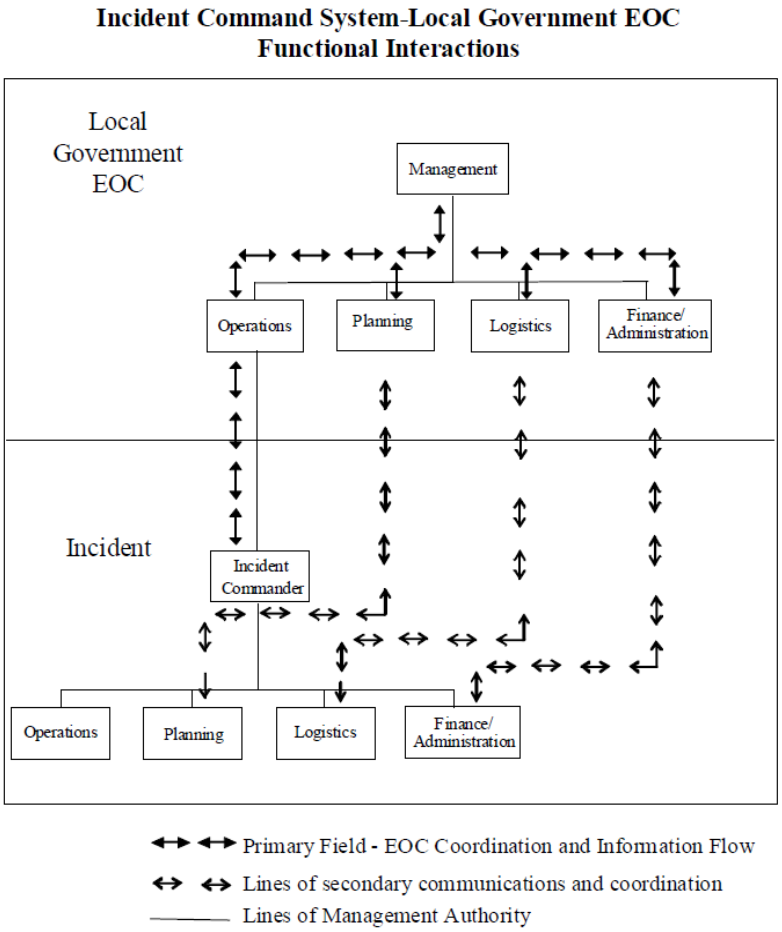
Because the system uses the 9-1-1 database, only landline numbers are in the system. If you have a Voice over Internet Protocol (VoIP) or cellular telephone and would like to be notified over that device, or if you would like an email notification, you must register those telephone numbers and/or email address for use by the system to receive voice, text, and email messages.

3 San Bernadino County Evacuation Planning

This Wildfire Evacuation Plan incorporates concepts and protocols practiced throughout San Bernadino County. The County follows basic protocols set forth in the County's EOP and California Master Mutual Aid Agreement, which dictate who is responsible for an evacuation effort and how regional resources will be requested and coordinated.

First responders are responsible for determining initial protective actions before EOCs and emergency management personnel have an opportunity to convene and gain situational awareness. Initial protective actions are shared/communicated to local EOCs and necessary support agencies as soon as possible to ensure an effective, coordinated evacuation. Figure 4 summarizes the functional interactions of local government EOCs under the Incident Command System.

Figure 4. Incident Command System Local Government EOC Functional Interactions



The SBCSD is the lead agency for executing evacuations of the unincorporated areas of the County. The SBCSD, as part of Unified Command, assesses and evaluates the need for evacuations, and orders evacuations according to established procedures. During an evacuation effort, the EOC Law Enforcement Branch Director supports the development of alert and warning messages and provides intelligence regarding road closures and evacuations, this position is staffed by the SBCSD. The SBCSD will be assisted by other law enforcement and support agencies. Law enforcement agencies, highway/road/street departments, and public and private transportation providers will conduct evacuation operations as directed by the OA EOC. Procurement, regulation, and allocation of resources will be accomplished by those designated. Evacuation operations will be conducted by the following agencies:

- San Bernadino County OES
- San Bernadino County Public Works Department
- San Bernadino County Department of Environmental Health Services (DEH)
- San Bernadino County Department of Aging and Adult Services
- San Bernadino County Agricultural Commissioner's Office
- Cal OES Law Enforcement Mutual Aid Region VI
- US Forest Service
- American Red Cross (ARC)
- Volunteers Active in Disasters (VOAD)
- California Highway Patrol (CHP)
- Transportation agencies
- Other County and state agencies, as needed.

As provided in the Big Bear Valley CWPP (Appendix D) the San Bernardino County Sheriff's Department maintains an exhaustive Emergency Evacuation/Reentry Plan for the Big Bear Valley, dated June 2005, to supplement the County EOC. During the Old Fire in 2003, the Emergency Evacuation/Reentry Plan for the Big Bear Valley was successfully implemented. The Emergency Evacuation Plan is a confidential document developed and further refined after the successful mountain evacuation during the 2003 Old Fire. The evacuation plan uses a tiered approach to evacuation, i.e., warning, voluntary, mandatory, immediate, and shelter-in-place.

3.1 P.A.C.E Evacuation Planning

P.A.C.E. evacuation planning is based on a military concept focused on mitigating risk by developing a strong primary evacuation plan along with three back up plans. If the Primary plan is compromised, the Alternate plan would be triggered. If the Alternate is considered not functional or not safe, the Contingency Plan is implemented. If that does not mitigate the risk, then the evacuation reverts to the Emergency plan. P.A.C.E. Planning is a simple and effective tool used to accomplish evacuations with flexibility and redundant contingencies.

A PACE Evacuation plan provides the following:

(1) Based on and includes a documented, facility-based and community-based risk assessment, utilizing hazard analysis approach.

(2) Include strategies for addressing emergency events identified by the risk assessment.

(3) Address participant population, including, but not limited to, the type of services the PACE organization has the ability to provide in an emergency; and continuity of operations, including delegations of authority.

(4) Include a process for cooperation and collaboration with emergency preparedness officials' efforts to maintain an integrated response during a disaster or emergency situation.

Primary: This is the overall preferred plan of action to use based on the most likely and most damaging scenario resulting from hazard analysis.

Alternate: The Alternate plan should be as viable as your Primary plan. That isn't always the case, but that should be the goal whenever possible. Alternate plans are needed because unforeseen circumstances arise during emergency evacuations.

Developing the Alternate plan includes analyzing the most likely problems that could cause your primary plan to fail and then come up with a plan that fits with your situation that won't be affected by those problems. Whenever possible, come up with a few to several vulnerabilities in your primary plan and find an alternate that's just as good but covers all those bases.

Contingency: The contingency evacuation plan is the action that will be implemented if you cannot implement either the Primary or the Contingency action due to compromised safety. The contingency isn't always (or isn't usually) as preferred as the others but is a viable option that doesn't rely on the same actions as the Primary and Alternate.

Emergency: This is the action that is implemented if all three of the previous actions fail. In some respects, it is a last resort that is the least preferred option, but is a viable and safe option, nonetheless. The goal is to utilize an Emergency plan that's independent from reliance on the types of actions in the first three options, is a flexible plan, has the highest probability of succeeding, and offers a reliable option with little potential for compromise.

An emergency plan may not be the most convenient or preferred plan and may include components that are uncomfortable to visitors, but it should be as foolproof as possible.

The Moon Camp Project PACE Evacuation Plan is summarized in Table 1, and must be maintained, reviewed, and updated at least every 2 years.

Table 1. P.A.C.E Evacuation Plan for Moon Camp Project

1. Primary: Project will evacuate via the primary evacuation route(s) early after receiving evacuation notice utilizing the primary evacuation route(s) as directed by law enforcement/emergency managers.
2. Alternate: Project will follow evacuation instructions which may include an alternate plan to utilize secondary routes or to relocate to nearby urban areas based on congested traffic conditions. Notifications that this alternate plan is being implemented will be provided via the notification systems or on-site emergency personnel, media and social media.
3. Contingency: Due to primary and alternate options being compromised or undesirable, the contingency plan of evacuating smaller, highest vulnerability populations will be implemented. For the Project, this may include evacuating until direction is provided to cease evacuation and initiate on-site sheltering of a smaller on-site population.
4. Emergency: When the wildfire or other emergency dictates that off-site evacuation is not advised by the primary or alternate evacuation routes, and conditions are such that open air exposure would be unhealthy or unsafe, the Moon Camp population will be directed to shelter in place. Sheltering in place is possible due to the ignition resistant construction materials and irrigated landscape that creates a fire hardened development. Sheltering in place may also be the preferred option for other emergencies, e.g., active shooter, earthquake. Persons sheltering in place are advised to remain aware of the situation and move out of the building to a designated safe zone if directed to do so or otherwise necessitated.

3.2 Evacuation Objectives

SBCSD is the lead agency for evacuations of areas within the County, including the proposed Moon Camp Project. The SBCSD, as part of a Unified Incident Command System, assesses and evaluates the need for evacuations, and orders evacuations according to established procedures. Additionally, as part of the Unified Incident Command System, the SBCSD identifies available and appropriate evacuation routes and coordinate evacuation traffic management with Caltrans, CHP, other supporting agencies, and all impacted jurisdictions.

The decision whether to evacuate or shelter-in-place must be carefully considered with the timing and nature of the incident. This decision is made by first responders in the field by the established Incident Command (IC) or Unified Command (UC). An evacuation effort involves an organized and supervised effort to relocate people from an area of danger to a safe location. Tactical decisions, such as detailed evacuation areas, specific routes, road closures and temporary evacuation points are decided in the field by IC or UC based upon the dynamics of the incident.

Per the County's EOP, evacuations are led by the Law Enforcement Operations Unit:

- Responsible for an orderly, systematic evacuation of residents and visitors due to an extreme emergency.
- Ensure that all items under the Americans with Disabilities Act are covered for evacuations/movement operations.
- Ensure public safety for incarcerated evacuees.
- Develop an evacuation and or re-entry plan.

3.3 Evacuation Response Operations

An evacuation of any area requires significant coordination among numerous public, private, and community/non-profit organizations. Wildfire evacuations will typically allow time for responders to conduct evacuation notification in advance of an immediate threat to life safety; giving occupants time to gather belongings and make arrangements for evacuation. On the other hand, other threats, including wildfires igniting nearby, may occur with little or no notice and certain evacuation response operations will not be feasible (for example, establishing contra flow requires between 24 to 72 hours to be implemented; a no-notice event will not allow for contra flow to be established). Evacuation assistance of specific segments of the population may also not be feasible.

3.3.1 Evacuation Points and Shelters

When the SBCSD or Incident Command (IC) implements an evacuation order, they coordinate with the responding fire and rescue agency, the EOC, and others, to decide on locations to use as a Temporary Evacuation Point (TEP). The SBCSD will provide emergency alerts through the TENS platform and Ready SB County app to direct evacuees to the established TEPs or shelters. These evacuation points will serve as temporary safe zones for evacuees and will provide basic needs such as food, water, and restrooms. Historical fires have not reached the City of Big Bear and the land uses along Big Bear Lake. In past fire events, the Incident Commander in partnership with the Red Cross have traditionally used local educational facilities as evacuation centers[1]. However, studies indicate that people generally resort to these evacuation centers only as a last option, mainly due to the absence of privacy and convenience[2]. Therefore, it is assumed that evacuees will likely head toward the more urbanized center of the City of Big Bear Lake, where multiple lodging options are available, or to stay with family and friends.

Possible shelters and assembly areas that can provide at least short-term refuge and that would be designated by emergency managers during an evacuation near the Project include:

- Big Bear High School
- Big Bear Middle School

If there are occupants unable to evacuate or in need of transportation assistance to get to a TEP or shelter, the SBCSD or IC may establish transportation points to collect and transport people without transportation resources to evacuation points. These transportation points should be large, well-known sites such as shopping centers, libraries, and schools. Transportation should be accessible to all populations, including people with disabilities and other access and functional needs.

3.3.2 Pet Evacuations

The Pets Evacuation and Transportation Standards Act of 2006 amends the Stafford Act, and requires evacuation plans to consider the needs of individuals with household pets and service animals, prior to, during, and following a major disaster or emergency.

The San Bernadino County Animal Care, a subdivision of the County Department of Public Health, has plans in place to transport and shelter pets in a disaster under ESF 16 of the OA EOP. Domestic animals in need of housing will

[1] http://www.bigbearfire.org/homepage/press-releases/252-radford-fire-update
[2] https://tsrc.berkeley.edu/publications/review-california-wildfire-evacuations-2017-2019

be accepted at and/or transported to animal shelters used by the Animal Control Unit; these may include County animal shelters and/or partner agency shelters. Animal Control will provide provisions for service animals at human shelters to include food, water, relief area identification and any other provisions needed to support the animal. Depending on the severity of the imminent or actual event, it may be necessary to prepare for and operate additional animal shelters. If ARC shelters are open for human evacuees, a determination will be made regarding the feasibility of co-locating animals at shelters. In most cases, humans and animals (not including service animals) cannot be co-located at the same shelter site due to concerns with allergies, bites, etc. Service animals are permitted at human shelters at all times and in every circumstance. If colocation is an option, animal response teams will be dispatched to ARC shelter sites and arrangements will be made to obtain emergency supplies and any specialized equipment needed to care for the animals.

If co-location is not an option, or if the animal is not a service animal, existing animal shelter sites will be utilized as noted above, the Animal Control Unit will provide for the pick-up and transport of animals from human shelter sites to animal shelter sites. Animals at shelter sites will be provided for with shelter, food, water and other necessary provisions. Animal Control has a professional system they use to identify and re-unify animals with their owners.

3.3.3 Shelter-in-Place (County EOP Discussion)

As stated in the County EOP, sheltering-in-place advises people to stay secure at their current location. This tactic shall only be used if an evacuation will cause a higher potential for loss of life. Consideration should be given to assigning incident personnel to monitor the safety of citizens remaining in place. The concept of shelter-in-place is an available option in those instances where physical evacuation is impractical. This procedure may be effective for residential dwellings in the immediately impacted areas, or for large facilities that house a high percentage of non-ambulatory persons (e.g., hospitals and convalescent homes). Sheltering-in-place attempts to provide a safe haven within the impacted area.

The decision on whether to evacuate or shelter-in-place is carefully considered with the timing and nature of the incident (San Bernadino County, 2018). Sheltering-in-place is the preferred method of protection for people that are not directly impacted or in the direct path of a hazard. This will reduce congestion and transportation demand on the major transportation routes for those that have been directed to evacuate by police or fire personnel. The communities adjacent to the proposed Moon Camp Project include homes built in the 2000s and are in varying states of ignition resistance. Unlike most new master planned communities that incorporate ignition-resistant construction and provide defensibility throughout, responding fire and law enforcement personnel may not be able to direct existing occupants of neighboring developments to temporarily refuge in their homes or on-site; however, it would be possible for occupants of Moon Camp Project. Developments that are not built to the ignition-resistant standards can be retrofitted to increase their ability to withstand wildfire and ember storms by focusing on roofs, windows, walls, vents, appendages and defensible space. Attention to these components of a home's fire protection system is recommended for existing home and business owners within the Project Area. The structures within the Project site would conform to the ignition-resistant building codes codified in Chapter 7A of the California Building Code, would be ignition-resistant, defensible and designed to require minimal firefighting resources for protection, which enables this contingency option when it is considered safer than evacuation.

4 Evacuation Road Network

As evidenced by historical mass evacuations in San Bernadino County and throughout Southern California, even with roadways that are designed to the code requirements, it may not be possible, or even the best response, to move large numbers of persons at the same time as part of a mass-evacuation. Instead, informed, phased evacuations enable more streamlined evacuations where those at highest risk are moved first. Road infrastructure throughout the United States, and including San Bernadino County, is not designed to accommodate a short-notice, mass evacuation without some level of congestion (FEMA 2008). The need for evacuation plans, pre-planning, and tiered or targeted and staggered evacuations becomes very important for improving evacuation effectiveness. Among the most important factors for successful evacuations in urban settings is control of intersections downstream of the evacuation area. If intersections are controlled by law enforcement, barricades, signal control, and other means, potential backups and slowed evacuations can be minimized. Multiple evacuation points enable more evacuees the ability to evacuate with less impact on roadways.

Wildfires that occur on non-extreme weather days behave in a much less aggressive manner and pose fewer dangers to life and property because they include less aggressive fire behavior and are easier to control. However, there can be on-shore wind conditions that can lead to aggressive fire behavior. Terrain and fuel are typically the wildfire drivers. During these non-extreme weather days, vegetation is much more difficult to ignite and does not spread fire as rapidly. In these situations, firefighters have a very high success rate of controlling fires and keeping them under 10 acres. The historical fire record shows that most vegetation fires occur during average weather conditions and that such fires account for only a proportionally small amount of the land area burned. Conversely, a small number of wildfires that occur during extreme fire weather account for most of the land area burned. These data highlight that the most dangerous fire conditions are those related to a fire that moves rapidly due to high winds and low humidity, whereas under normal conditions fires are likely to be controlled with no evacuation or possibly limited extent, focused evacuations.

While it is possible that a fire driven by average wind conditions could require evacuation of the Project, such an event would be highly unusual. Moreover, due to the reduced fire behavior during normal weather periods, the evacuation would not be expected to be a large-scale evacuation. Instead, most of the Project area population would be anticipated to remain at their locations and within their communities, with a more targeted evacuation being ordered, if needed.

If a wildfire ignited closer to the Project site during weather that facilitates rapid fire spread, a different evacuation approach would need to be considered. Because it is preferred to evacuate long before a wildfire is near, and in fact, history indicates that most human fatalities from wildfires are due to late evacuations when evacuees are overtaken on roads, it is prudent to consider a contingency option. For example, if a wildfire is anticipated to encroach upon the Project area in a timeframe that is shorter than would be required to evacuate all occupants, then options available to responding fire and law enforcement personnel should include 1) partial relocation where occupants are temporarily relocated to nearby shelter sites or areas, or 2) temporary shelter in place where occupants are instructed to remain in protected on-site structures or at a designated site, while firefighters perform their structure protection function.

The Project site is located within an area that is subject to wildfires and based on the adjacent land uses and open space in the vicinity, the wildfire potential is considered high. However, the fire intensity would be expected to be

moderate within the post-Project's developed footprint and fuel modification zones, and high to very high within the open space areas that occur adjacent to the Project site. This on-site, reduced fire behavior along with specific protection features, would be expected to facilitate evacuations as well as potential on-site sheltering within designated safe shelter structures, if considered safer than a short-notice evacuation. Although not a designated shelter-in-place site, Project structures include the same level of ignition resistance (e.g., enhanced construction materials) and landscape maintenance (e.g., annual FMZ inspection), are defensible against the anticipated wildfire exposure, and are designed to require minimal resources for protection, which enables this contingency option.

The Project roads and adjacent road circulation system will be able to effectively handle average daily trips generated by the Project. However, as evidenced by mass evacuations in San Bernadino and elsewhere, even with roadways that are designed to the code requirements, it may not be possible, or even necessary to move large numbers of persons at the same time. Road infrastructure throughout the United States, and including in the Big Bear region, is not designed to accommodate a short-notice, mass evacuation (FEMA 2008). The need for evacuation plans, pre-planning, and tiered or targeted and staggered evacuations becomes very important for improving evacuation effectiveness.

Among the most important factors for successful evacuations in populated settings is control of intersections downstream of the evacuation area. If intersections are controlled by law enforcement, barricades, signal control, firefighters or other means, potential backups and slowed evacuations can be minimized. Another important aspect of successful evacuation is a managed and phased evacuation declaration. Evacuating in phases, based on vulnerability, location, or other factors, enables the subsequent traffic surges on major roadway to be smoothed over a longer time frame and can be planned to result in traffic levels that flow better than when mass evacuations include large evacuation areas at the same time. This WEP defers to Law Enforcement and EOC to appropriately phase evacuations and to consider the vulnerability of communities when making decisions. For example, newer development in the area, including the Project, will offer its occupants a high level of fire safety on-site, along with options for firefighter safety zones and temporary on-site refuge as a contingency, as discussed further in this WEP.

Fire Access Road Maintenance

Maintenance is an important component for the long-term reliability of all Project roadways. Maintenance obligations for the Moon Camp Project will be the responsibility of the Owner/Property Manager for routine road surface and roadside vegetation maintenance throughout the Project site.

4.1 Evacuation Assumptions and Scenarios

This evacuation analysis was performed for the Project to determine how long it would take for residents of the Project and the surrounding communities to evacuate to the developed areas of the City of Big Bear Lake in case of a fire emergency. This location provides a significant buffer to the north/northeast with Big Bear Lake acting as a large fuel break Current evacuation practice typically targets the scope of the evacuation only to the area in immediate danger and placing a larger area on standby for evacuation. This practice allows for better evacuation operations, reduces gridlock, and reserves sufficient travel way for emergency vehicles. It is assumed that first responders or law enforcement will direct traffic at all major downstream intersections during the evacuation process.

During the evacuation process, which can proceed aided by typical roadside vegetation management, wildfire spread, and encroachment may be slowed by fire-fighting efforts that would likely include fixed wing and helicopter

fire-fighting assets. Hand crews would also be deployed toward containment. None of the evacuation scenarios assumed contraflow lanes, as these lanes are reserved for first responders, law enforcement, and fire fighters in case of unforeseen circumstances.

Since the Project is located amidst residential and recreation land uses, this examination assumes an evacuation directive on a Saturday afternoon when most Project and neighboring residents are expected to be at home, while the Project operations continue. The estimation of vehicles evacuating from the Project's site was derived by multiplying the number of households by the average vehicle ownership per household in the vicinity. Similarly, for the surrounding residential areas, the number of evacuating vehicles was determined using land use information from Parcel Quest parcel map data in conjunction with the average vehicle ownership data provided by the US Census Bureau. For a reasonable analysis, these scenarios assumed that two percent (2%) of the evacuating vehicles are heavy vehicles (trucks with trailers). Two percent is the nationally acceptable ratio of heavy vehicles to all vehicles.

Saturday Afternoon Evacuation: full operation, all residents are home

CRA presumes that the evacuation would transpire on a Saturday afternoon, a time when residents from the Project and nearby communities are home, meaning all residential vehicles would be required to evacuate. Additionally, it is assumed that the parking demand for nearby recreational land uses would be fully occupied, thus the vehicles associated with the recreational land uses would evacuate at the same time as the Project and other residential land uses. In an actual evacuation scenario, the total number of vehicles needing to evacuate may actually be less. The Operation Area commander would prioritize evacuation of land uses located closest to the area with immediate risk, depending on the location of the fire. Additional assumptions during wildfire are as follows:

1. The Operation Area commander would prioritize land uses located adjacent to the Wildland Urban interface area or area with immediate risk, depending on the location of the fire.

2. Because wildfire may burn up to and potentially within urban areas in the Project vicinity, for a conservative analysis, it is assumed that all of the areas shown in Figure 3 of Appendix C would evacuate at the same time.

3. The analysis also operates under the assumption that the traffic to be evacuated would be directed to the developed areas of the City of Big Bear Lake, selecting the path requiring the least traffic time. It is assumed that the Project and surrounding land uses would utilize local thoroughfares including SR-38/North Shore Drive, Stanfield Cutoff, Big Bear Boulevard, using the path requiring the least travel time.

Primary Evacuation Routes

CRA assumed that traffic evacuating from both the Project and nearby communities/land uses would use the closest evacuation routes to leave the area. Evacuation routes were selected based upon review of the Project's site, available evacuation routes, and the quickest way to leave areas located adjacent to the available vegetative fuels. Evacuations during large wildfire events would focus on removing threatened populations from the area, likely off the mountain. For this analysis, we assume a condition where the populations are directed to the developed areas of the City of Big Bear Lake, selecting the path requiring the least travel time. This location provides a significant buffer to the north/northeast with Big Bear Lake acting as a large fuel break. Based on Google's traffic data for a typical Saturday afternoon, the fastest evacuation route for traffic from the Project and areas A through

C would be to head east on SR-38/North Shore Drive and then proceed towards the City of Big Bear Lake via Stanfield Cutoff and Big Bear Boulevard. Conversely, the quickest route for Area D would be to head southwest via North Shore Drive and Big Bear Boulevard. The Google travel time assessment is provided in Attachment A of Appendix C. This assumption selects a reasonable evacuation route for the assumed extreme weather scenario.

No contraflow lanes were assumed to provide access for first responders and law enforcement.[3] Two-way travel was assumed, with evacuating vehicles traveling outbound to the designated Safe Zone. It is assumed that first responders or law enforcement will direct traffic at all major intersections during the evacuation process. Should evacuation managers determine that contraflow is preferred or necessary, evacuation capacity would increase while evacuation times would decrease.

Safe Zone

Based on Dudek's review of the area's fire history[4], fires have halted along areas adjacent to wildland fuels and have not historically progressed into the more densely urbanized, irrigated, and hardscaped areas. Specifically, none of the historical fires encroached beyond the periphery areas within the wildland urban interface area of the City of Big Bear Lake and the land uses along Big Bear Lake. Thus, it is assumed that evacuees are considered to reach a safe area once they are within the more developed areas such as the City of Big Bear Lake.

Evacuation Scenarios

A total of seven evacuation scenarios were analyzed for each fire scenario: fire encroaching on the Project from the north/east and fire encroaching on the Project from the west. The evacuation modelling for a fire encroaching from the west assumed that all evacuation zones including Area D would utilize eastbound evacuation routes.

- **Scenario 1** – *Existing Land Uses*: This scenario estimates the evacuation time for existing land uses within the study area (Area A through D), reference Figure 4. This scenario represents the existing condition, and provides context for how the Project could potentially impact evacuation times in the study area.
- **Scenario 2** – *Proposed Project Only*: This scenario assumed full evacuation of the proposed Project without evacuation of existing land uses. This scenario establishes the time needed to evacuate only the Project's occupants.
- **Scenario 3** – *Existing Land Uses with the proposed Project*: This scenario estimates the evacuation time for the all existing land uses within the study area (Area A through D), with the addition of the proposed Project traffic. The scenario represents the potential for the Project to impact evacuation times for the existing condition (Scenario 1).
- **Scenario 4** – *Existing Land Uses with Cumulative Growth*[5]: This scenario estimates the evacuation time for the existing land uses within the study area (Area A through D), with an ambient growth of 5% to represent

[3] Contraflow or lane reversal involves directing traffic to use lanes coming from the source of a hazard to move people away from the hazard. Such a strategy can be used to eliminate bottlenecks in communities with road geometries that prevent efficient evacuations or to facilitate traffic flow out of a major urban area. Among the considerations in planning emergency contraflow are whether sufficient traffic control officers are available, potential negative impact on responding fire apparatus, access management, merging, exiting, safety concerns, and labor requirements. Contraflow configurations must be carefully planned based on on-site factors and should not be implemented in an *ad-hoc* fashion. Dudek July 2014. "Wildland Fire Evacuation Procedures Analysis" for City of Santa Barbara, California, page 65.

[4] 2022 Radford Fire, 2017 Holcomb Fire, others. An unnamed 1987 fire did burn into the Baldwin Lakes area destroying 5 homes, but they were of older construction and water wasn't available for firefighting in the area at that time.

potential cumulative growth in the area, the Marina Point project (120 dwelling units)[6] and TT 17670 (22 dwelling units). This scenario represents cumulative growth conditions without the Project, which considers both ambient growth and other known proposed or approved projects in the area.

- **Scenario 5** – *Existing Land Uses with Cumulative Projects with the proposed Project*: This scenario is similar to Scenario 4, with the addition of the proposed Project traffic. The scenario represents cumulative growth conditions with the Project, which considers both ambient growth and other known proposed or approved projects in the area.
- **Scenario 6** - Existing Land Uses with Cumulative Projects (Area D only): This scenario is similar to Scenario 4, but assuming that only Area D is under an evacuation order. Under this scenario, all of Area D would evacuate eastward via North Shore Drive, then southward via Stanfield Cutoff to arrive at the City of Big Bear. This scenario represents cumulative growth conditions without the Project, which considers both ambient growth and other known proposed or approved projects in the area; however, only Area D is under an evacuation order.
- **Scenario 7** – Existing Land Uses with Cumulative Projects with Project (Area D only) – This scenario is similar to Scenario 6, with the addition of the proposed Project traffic. This scenario represents cumulative growth conditions with the Project, which considers both ambient growth and other known proposed or approved projects in the area; however, only Area D is under an evacuation order.

Evacuating Vehicles

The number of evacuating vehicles was calculated using the following assumptions:

- Project and nearby Residential land uses: Residential units x average vehicle ownership (2 vehicles per household)
- Recreational land uses: full occupancy of parking lots
- RV resorts: full occupancy of parking lots and site.

Average vehicle ownership, residential units, and evacuating vehicles calculations are provided in Attachment A of Appendix C. Table 2 displays the number of vehicles evacuating under each scenario.

Table 2. Evacuating Vehicles

Scenario	Number of Evacuation Vehicles					
	Nearby Land Uses				*Project*	*Total*
	A	*B*	*C*	*D*		
Scenario 1 – Existing Land Uses	112	380	394	1,425	0	1,425
Scenario 2 – Proposed Project Only	0	0	0	0	100	100
Scenario 3 – Existing Land Uses with Proposed Project	112	380	394	1,425	100	1,525
Scenario 4 – Existing Land Uses with Cumulative Projects	120	400	420	1,790	0	1,790
Scenario 5 – Existing Land Uses with Cumulative Projects with the proposed Project	120	400	420	1,790	100	1,890

[6] Source: Moon Camp Focused Traffic Impact Assessment, Urban Crossroad, 2018.

Scenario 6 - Existing Land Uses with Cumulative Projects (Area D only)	0	0	0	1,790	0	1,790
Scenario 7 - Existing Land Uses with Cumulative Projects with Project (Area D only)	0	0	0	1,790	200	1,990

Source: CR Associates (2023), US Census Bureau (2023), Google Maps (2023).

INTENTIONALLY LEFT BLANK

4.2 Potential for Project Evacuation Impact on Existing Conditions

The potential occurrence of a simultaneous, large evacuation event including evacuation of a large area of existing populations is minimal, but possible. In this case, the existing populations for potential evacuation in the area would be associated with a variety of populations including residential, recreational, and other uses. To analyze the evacuation events, CRA conducted simulations using Vissim, a microscopic, multimodal traffic flow modeling software used to simulate different traffic conditions. In Vissim simulations, roadway capacity is accounted for and each vehicle in the traffic system is individually tracked through the model and comprehensive measures of effectiveness, such as average vehicle speed and queueing, are collected on every vehicle during each 0.1-second of the simulation. This software enables drivers' behaviors during an evacuation to be replicated. A total of 20 simulations were conducted to yield a reasonable sample size to determine the performance of the study area roadways and impacts during evacuation scenarios. To be conservative, CRA assumed a worst-case scenario in which all vehicles belonging to households in the study area would be used in the evacuation, instead of the necessary number of vehicles needed to evacuate the impacted population. Detailed evacuation analysis information is provided in Attachment B of Appendix C.

Based upon review of previous fires and evacuation orders, evacuation modeling considered traffic evacuating from both the Project and nearby developments (Figure 4). A summary of the evacuation time for each scenario is provided below, and shown in Table 3:

- **Scenario 1**: It would take between 37 minutes and 1 hour and 23 minutes to evacuate the existing land uses (Areas A through D).
- **Scenario 2**: It would take 25 minutes to evacuate only the proposed Project occupants. Existing land uses are not considered in the scenario.
- **Scenario 3**: It would take between 37 minutes and 1 hour and 23 minutes to evacuate the existing land uses and the proposed Project. Under this scenario, the Project would not cause an increase in evacuation time to area D, and the Project would cause an increase of 5 minutes to area A and 2 minute to area B. It would take 52 minutes to evacuate the Project's site.
- **Scenario 4**: It would take between 38 minutes and 1 hour and 39 minutes to evacuate the nearby land uses under the cumulative growth scenario.
- **Scenario 5**: It would take between 39 minutes and 1 hours and 39 minutes to evacuate the nearby and Project land use under the cumulative growth with Project scenario. Similar to Scenario 3, the Project would cause an increase of 6 minutes to area A evacuation time and an increase of 2 minute to area B evacuation time. It would take 54 minutes to evacuate the Project's site.
- **Scenario 6:** It would take 1 hour and 40 minutes to evacuate Area D, assuming that all of Area D evacuate eastward via North Shore Drive, then southward via Stanfield Cutoff to arrive at the City of Big Bear.
- **Scenario 7**: It would take 1 hour and 42 minutes to Evacuate Area D, an increase of 2 minutes, and 26 minutes to evacuate the Project.

Table 3. Evacuation Time Summary

Scenario	Total Evacuation Vehicles	Evacuation Time				
		Nearby Land Uses				*Project*
		A	*B*	*C*	*D*	
Scenario 1 – Existing Land Uses	1,425	0:48	0:38	0:37	1:23	N/A
Scenario 2 – Proposed Project Only	100	N/A	N/A	N/A	N/A	0:25
Scenario 3 – Existing Land Uses with Proposed Project	1,525	0:53	0:40	0:37	1:23	0:52
Change in Evacuation Time - Existing Condition (Scenario 3 – Scenario 1)	-	0:05	0:02	0:00	0:00	0:52
Scenario 4 – Existing Land Uses with Cumulative Projects	1,790	0:50	0:41	0:38	1:39	N/A
Scenario 5 – Existing Land Uses with Cumulative Projects with the proposed Project	1,890	0:56	0:43	0:38	1:39	0:54
Change in Evacuation Time – Existing with Cumulative Projects (Scenario 5 – Scenario 3)	-	0:06	0:02	0:00	0:00	0:54
Scenario 6 - Existing Land Uses with Cumulative Projects (Area D only)	1,790	N/A	N/A	N/A	1:40	N/A
Scenario 7 - Existing Land Uses with Cumulative Projects with Project (Area D only)	1,990	N/A	N/A	N/A	1:42	0:26
Change in Evacuation Time – Existing with Cumulative Projects Area D only (Scenario 5 – Scenario 3)	-	N/A	N/A	N/A	0:02	0:26

As noted in Table 3, Project related impacts to existing community evacuation times are considered insignificant with the maximum potential increased evacuation time occurring within Land Use A(Scenario 1 compared to Scenario 3) of 5 minutes. Under the cumulative scenarios (Scenario 4 compared to Scenario 5), the Project's greatest impact is to Land Use A, increasing evacuation time six minutes, with a 2-minute increase to Land Use B and no increase for Land Use C or Land Use D. Additionally, the Project does not contribute to a substantial increase in evacuation times for Land Use D under the cumulative scenarios that include an evacuation order for Area D only, as indicated with a minor increase in evacuation time by two minutes (Scenario 6 compared to Scenario 7).

Under the most conservative scenario, changes in evacuation times (Scenario 1 compared to Scenario 5 and 7) are minor for Land Use Areas A through D, with 6-, 2-, 0-, and 2-minute increases in evacuation time with the proposed Project, respectively. The 1-to-6-minute potential evacuation time increases are considered minimal and do not result in evacuation times for existing residents that would be considered excessive. The minimal increase in evacuation time due to the proposed Project is further insubstantial when considering the thousands of recreationalists who visit the region during and contribute to increased evacuation times. The Project's resident population would be considered a small relative increase to the region's visitor and resident population.

Additionally, it is possible that all evacuees would be instructed to evacuate off the mountain during certain large fires threatening the Big Bear region. In this type of scenario, it is likely that many people from the greater region

would be evacuating, unless told they cannot pass through evacuation roadways. Wildfires requiring off mountain evacuations would likely be driven by distant wildfires approaching the region that would likely provide sufficient time (multiple hours to days) to move evacuees off the mountain. As detailed above, in the event of a mass evacuation off the mountain, the Project would not significantly contribute to the overall evacuation traffic in the study area.

Study of evacuation timeframes and potential increases in evacuation time with a proposed project are relatively new CEQA focus areas. Public safety, not time, is generally the guiding consideration for evaluating impacts related to emergency evacuation. Consistent with CEQA Guidelines Appendix G, a Project's impact on evacuation is significant if the Project will significantly impair or physically interfere with implementation of an adopted emergency response or evacuation plan.

In any populated area, safely undertaking large-scale evacuations may take several hours or more and require moving people long distances to designated areas. Further, evacuations are fluid and timeframes may vary widely depending on numerous factors, including, among other things, the number of vehicles evacuating, the road capacity to accommodate those vehicles, residents' awareness and preparedness, evacuation messaging and direction, and on-site law enforcement control. The "Best Practices for Analyzing and Mitigating Wildfire Impacts of Development Projects Under the California Environmental Quality Act" guidance from the California Office of the Attorney General suggests that jurisdictions set benchmarks of significance based on past successful evacuations or on those from communities in similar situations.

A recent study titled "Review of California Wildfire Evacuation from 2017 to 2019 " provides more insights on the topic. This research involved interviews with 553 individuals (297 evacuees affected by various fires) including the Creek Fire, Rye Fire, Skirball Fire, and Thomas Fire. The study aimed to understand the decision-making processes of these individuals during the fires, such as whether to evacuate or stay, when to leave, the paths taken, chosen shelters, destinations, and modes of transportation. According to this research, the time it took for evacuations ranged from under 30 minutes to over 10 hours. From this dataset , the average evacuation time for the Creek Fire was found to be 3 hours and 40 minutes, involving 115,000 people . For the Thomas Fire, the average time was 4 hours and 25 minutes, impacting 104,607 individuals.

California fire and law enforcement agencies have integrated training, experience, and technology to assist in successful evacuations, which focus on moving persons at risk to safer areas before a wildfire encroaches on a populated area. Timeframes for moving people vary by site specifics, population, road capacities and other factors and there is no one threshold that would be appropriate to all locations. There are no established thresholds for evacuation times for this Project or at the time of this plan's preparation, for any California community, to the knowledge of the authors. This is primarily because every location and fire scenario are unique. While it may take one community 20 minutes to evacuate safely, it is not a valid assumption to consider a 3-hour evacuation for another community as unsafe. The 3-hour evacuation can be very safe while the 20-minute evacuation may be unsafe due to the conditions and exposures along the evacuation routes.

Notwithstanding evacuation challenges and variables, the City/County is safely managing both mass and targeted evacuations to great success. It should be noted that other variables can impact evacuation success. For instance, some individuals may choose to stay behind to defend their property or adopt a wait-and-see approach. Such decisions could delay their evacuation to a point where it becomes too late to leave safely.

Technological advancements and improved evacuation strategies learned from prior wildfire evacuation events have resulted in a system that is many times more capable of managing evacuations. With the technology in use today, evacuations are more strategic and surgical than in the past, evacuating smaller areas at highest risk and phasing evacuation traffic so that it flows more evenly and minimizes the surges that may slow an evacuation. Mass evacuation scenarios where large populations are all directed to leave simultaneously, resulting in traffic delays, are thereby avoided, and those populations most at risk are able to safely evacuate. While mass evacuation scenarios are avoided with the technology in use today, the evacuation simulations conducted in this report are based on mass evacuation scenarios to provide a worst-case scenario, as described previously.

As indicated previously, the evacuation scenarios considered herein represent mass evacuations in the Project vicinity to provide extremely worst-case scenarios. The Incident Commander would direct a focused evacuation of zones situated near the wild urban interface, which are at higher risk. Areas that are not in immediate danger would likely not be provided with an evacuation notice initially and may be instructed to remain in place to prioritize the evacuation of vehicles from areas under direct threat. This would result in phasing evacuation traffic so that it flows more evenly and minimizes the surges that may slow an evacuation. Therefore, evacuation flow would be able to be effectively managed and would not likely lead to mass evacuations, as simulated in this report.

Neither CEQA, nor San Bernardino County has adopted numerical time standards for determining whether an evacuation timeframe is appropriate. Public safety, not time, is generally the guiding consideration for evaluating impacts related to emergency evacuation. San Bernardino County has historically had an extremely high success rate for safely evacuating large numbers of people and doing so in a managed and strategic way using available technological innovations. Safely undertaking large-scale evacuations may take several hours or more and require moving people long distances to designated areas. Further, evacuations are fluid and timeframes may vary widely depending on numerous factors, including, among other things, the number of vehicles evacuating, the road capacity to accommodate those vehicles, residents' awareness and preparedness, evacuation messaging and direction, and on-site law enforcement control.

Due to its location, the Project would also provide the responding emergency managers (e.g., Incident Commander, SBCSD) the alternative option of recommending that all or a portion of the onsite population shelter in place. This on-site sheltering option is a contingency plan, but an important option in the scenario when evacuation is considered infeasible or the less safe option. This would provide emergency managers with a safer alternative to risking a late evacuation.

Based on the Project area's fire environment, its fuels and terrain along with weather factors, wildfire spread rates during extreme fire events are anticipated to be less aggressive than in heavy fuel, steep terrain locations. If ignitions occur nearby the site, then less time would be available for evacuation, and would need to include an alternative approach if the evacuation routes were considered less safe. Based on the results of this comparison, evacuation of the site is possible in all modeled scenarios. Certain scenarios noted above are projected to potentially use alternative actions, like focusing all evacuating vehicles to one of the three available routes and in one example, considering the possibility of a delayed evacuation where parts of the population could be directed to remain on-site until the fire burns out in the sparse fuels around the evacuation route, and then evacuated through evacuation corridors. However, the Project is considered to be well-suited for evacuations given the three potential separate evacuation routes and the alternative option of temporarily seeking refuge on-site in the wide, converted landscapes that would not readily facilitate wildfire spread.

The Project provides several features that would enhance orderly and safe evacuation, but which are not reflected in the average evacuation time results above. These features include evacuation preparedness, fuel modification along Project roadways, structural hardening of Project structures, and temporary refuge areas and "shelter-in-place"[7] options. These evacuation enhancements would reduce the potential for evacuation friction or interruption; however, such enhancements cannot be well depicted by the traffic evacuation model.

4.1.1 Mass Evacuation Vehicle Traffic

Mass evacuation events have become less common as wildfire evacuation technology and capabilities have improved dramatically in the last 15 years. Wildfire evacuations are managed to move smaller populations in a successive phasing to minimize traffic surges. Populated areas are evacuated in phases based on proximity to the event and risk levels. For example, it is anticipated that wildfire evacuations of the Project area will likely include the relocation of residential populations that are closest to open space, along with residents and visitors of the Project first, and then additional populations based on exposure to the wildfire in successive fashion rather than mass evacuating the entire Big Bear area. The Project is built to ignition resistant standards and represent fire-safe fuel breaks that provide emergency managers many options. The result of this type of evacuation is that residents and visitors that may be in locations that would be closest to a wildfire burning in open space areas are temporarily moved from the vicinity and vehicle congestion on evacuation routes is minimized, enabling a more efficient evacuation. Under this evacuation approach, the evacuation would include a much smaller population and would be implemented in a surgical way. The evacuation time would be even lower and would have very little impact on the existing communities.

PHASED EVACUATION The purpose of a phased evacuation is to reduce congestion and transportation demand on designated evacuation routes by controlling access to evacuation routes in stages and sections. This strategy can also be used to prioritize the evacuation of specific populations that are in proximity to the immediate danger. A phased evacuation effort will need to be enforced by law enforcement agencies and coordinated with the EOC and affected jurisdictions.

Dept of Homeland Security (2019) provides supporting data for why jurisdictions have moved to the surgical evacuation approach that leverages the power of situation awareness to support decision making. According to their Planning Considerations: Evacuation and Shelter in Place document, they indicate that delineated zones provide benefits to the agencies and community members. Evacuation and shelter-in-place zones promote phased, zone-based evacuation targeted to the most vulnerable areas, which allows jurisdictions to prioritize evacuation orders to the most vulnerable zones first and limit the need to evacuate large areas not under the threat. Zones help:

- Jurisdictions to understand transportation network throughput and capacity, critical transportation and resource needs, estimated evacuation clearance times, and shelter demand.
- Planners to develop planning factors and assumptions to inform goals and objectives.
- Community members to understand protective actions to take during an emergency.
- Shelters to limit traffic congestion and select locations suitable for the evacuated population.

[7] Shelter-in-place involves the use of a structure, including homes, to temporarily separate individuals from a hazard or threat, and is implemented when a hazard or threat is imminent or occurring and a safe evacuation is not feasible.

The amount of time needed to evacuate the Project would vary by the type of incident, the number of evacuation routes utilized, the amount of mobilization time, actual areas at risk, and other factors. It has also been established herein that the targeted approach would minimize the size of the area being evacuated and use a phased approach, which may further reduce the evacuation time estimates.

There is no evacuation timeframe threshold that Projects must meet in order to avoid a CEQA impact or to be consistent with codes, regulations or policies. Regardless, the Project has provided a comprehensive evacuation evaluation, and the evacuation time results are comparable to similar sized populations under a mass evacuation.

Further, any additional time does not necessarily generate a greater safety risk. Emergency personnel who issue evacuation orders can consider the additional time needed to implement an evacuation when determining when and where to issue evacuation orders. Risk to nearby development, including the Project or existing communities, is assessed on a regular basis in a wildfire event. Hours or days of lead time may be available to assess risk and make evacuation determinations. Further, peak occupancy conditions like those assumed in the modeling typically do not occur as all residents are not typically at home while maximum occupancy at industrial, commercial and office uses is also occurring. Further, drifting smoke, awareness of the risk, road closures, or other factors result in people avoiding the area in a fire event. Additionally, the Project is designed to allow people to shelter-in-place or take temporary refuge within the Project site, which could reduce evacuating traffic from the site.

The potential occurrence of a large evacuation event including evacuation of existing populations is minimal, but possible. In this case, the existing populations for the Project would be existing residential recreational uses to the east and west. During a large wildfire moving from north to south or east to west, it is most likely, that evacuations would be directed to the developed areas of the City of Big Bear Lake, depending on the fire location and movement. The vehicle capacity estimates utilized for this evacuation plan are based the current Highway Capacity Manual methodology for calculating adjusted saturation flow rates and are discounted for various assumed traffic-related slowing, such as higher volume and downstream bottlenecks; therefore, the discounted vehicle capacity includes capability to absorb additional vehicles.

In an actual evacuation scenario, a phased evacuation would be implemented where orders are given to evacuate based on vulnerability, location, and/or other factors, which enables the subsequent traffic surges on major roadways to be smoothed over a longer time frame and improve traffic flow. A phased strategy can also be used to prioritize the evacuation of certain communities that are in proximity to the immediate danger. The limitations of the model used for this analysis are such that it cannot accurately reflect phased evacuation conditions; hence, a worst-case mass evacuation scenario was assumed.

This WEP assumes that law enforcement personnel are controlling downstream intersections to maintain traffic flow out of the area. If traffic flow is not maintained, then the estimated evacuation times would be expected to increase, potentially substantially, as is the case in any urban area. Additionally, this analysis assumes that all existing populations within the Project area and the Project are evacuating simultaneously.

4.2 Evacuation Route Determination

Typically, fire and law enforcement officials will identify evacuation points before evacuation routes are announced to the public. Evacuation routes are determined based on the location and extent of the incident and its spread rate and direction and include as many pre-designated transportation routes as possible. However, field conditions

and shifting fire behavior may result in real-time changes to predetermined routes. Having additional evacuation route options is considered critical in these conditions. Evacuees are considered to reach a safe area once they are within the more densely urban areas such as the developed areas within the City of Big Bear Lake.

5 Wildfire/Evacuation Awareness

The Moon Camp Project HOA or property manager should be active in its outreach to its residents regarding fire safety and general evacuation procedures. There are aspects of fire safety and evacuation that require a significant level of awareness by residents in order to reduce and/or avoid problems with an effective evacuation. Mitigating potential impediments to successful evacuations requires focused and repeated information through a strong educational outreach program. The Moon Camp Project should engage occupants and coordinate with local fire agencies for fire safety awareness through a variety of methods.

This Wildfire Evacuation Plan will be accessible on the Project's website. It is strongly recommended that an annual reminder notice be provided to each resident encouraging them to review this WEP and be familiar with community evacuation protocols. Additionally, it is also recommended that the Developer coordinate with local fire agencies to hold an annual fire safety and evacuation preparedness informational meeting for residents. The meeting should be attended by representatives of appropriate fire agencies and important fire and evacuation information should be reviewed.

The focus of the "Ready, Set, Go!" program (Appendix A) is on public awareness and preparedness, especially for those living and/or working in wildland-urban interface (WUI) areas. The program is designed to incorporate the local fire protection agency as part of the training and education process in order to ensure that evacuation preparedness information is disseminated to those subject to the potential impact from a wildfire. There are three components to the program:

- "READY" – Preparing for the Fire Threat: Take personal responsibility and prepare long before the threat of a wildfire so you and your home are ready when a wildfire occurs. Residents should assemble an emergency kit for their car. Confirm you are registered for Reverse 911, TENS and SB Ready App. Make sure all residents understand the plan, procedures and escape routes.
- "SET" – Situational Awareness When a Fire Starts: If a wildfire occurs and there is potential for it to threaten the Project site and surrounding communities, be ready to evacuate. Stay aware of the latest news from local media and your local fire department for updated information on the fire. If you are uncomfortable, leave the area.
- "GO!" – Leave Early! Leaving early, well before a wildfire is threatening the Project area, provides you with the least delay and results in a situation where, if a majority of neighboring developments also leave early, firefighters are now able to better maneuver, protect and defend structures, evacuate other occupants who couldn't leave early, and focus on citizen safety.

"Ready, Set, Go!" is predicated on the fact that being unprepared and attempting to flee an impending fire late (such as when the fire is physically close to your community) is dangerous and exacerbates an already confusing situation. This Wildfire Evacuation Plan provides key information that can be integrated into the individual evacuation plans, including the best available routes to use in the event of an emergency evacuation.

San Bernadino County OES also provides a brochure providing guidelines and recommendations for family evacuation planning as provided in Appendix B. It is recommended that this brochure me made readily available to project residents.

Situation awareness requires a reliable information source. San Bernadino County using TENS and the SB Ready App Emergency Notification System, and all residents should be encouraged to register for emergency alerts. It is up to individual residents to register their cell phones for TENS. The registration of cell phones can be done online at http://www.sbcounty.gov/SBCFire/TENS/TENSContact.aspx. In addition, the San Bernadino County Emergency Alert System (EAS) is county-wide and broadcasts emergency information via four radio stations, KFRG 95.1 FM, KVCR 91.9 and KXFG 92.9 FM.

As part of the Project, the Developer will be responsible for providing access to this Wildfire Evacuation Plan, including materials from the "Ready, Set, Go!" Program and County OES Family Evacuation Planning Guidelines. As part of the approval of the Moon Camp Project, it shall be binding on Owner(s)/Property Manager to actively participate as a partner with the SBCFD to assist with the coordination and distribution of fire safety information they develop to residents.

6 Evacuation Procedures

6.1 Relocation/Evacuation

It is estimated that the conservatively calculated minimum amount of time needed to move the exiting and Project populations to urbanized and/or designated evacuation areas may require approximately up to 1 hour and 39 minutes under varying constraints that may occur during an evacuation. This does not include additional allowances for the time needed to detect and report a fire, for fire response and on-site intelligence, for phone, patrols, and aerial based notifications, and for notifying special needs citizens.

Wolshon and Marchive (2007) simulated traffic flow conditions in a computer derived WUI under a range of evacuation notice lead times and housing densities. To safely evacuate more people, they recommended that emergency managers (1) provide more lead time to evacuees and (2) control traffic levels during evacuations so that fewer vehicles are trying to exit at the same time.

Wildfire emergency response procedures will vary depending on the type of wildfire and the available time in which decision makers (IC, SBCFD, CAL FIRE, SBCSD, and/or OES) can assess the situation and determine the best course of action. Based on the Moon Camp Project and surrounding communities, its road network, and the related fire environment, the first and primary type of evacuation envisioned is an orderly, pre-planned evacuation process where people are evacuated to more urban areas further from an encroaching wildfire (likely to urban areas west) well before fire threatens. This type of evacuation must include a conservative approach to evacuating; i.e., when ignitions occur and weather is such that fires may spread rapidly, evacuations should be triggered on a conservative threshold that includes time allowances for unforeseen, but possible, events that would slow the evacuation process.

The second type of evacuation is considered by many to offer the highest level of life protection to the public, but it can result in evacuees being placed in harm's way if the time available for evacuation is insufficient (Cova et al. 2011). An example of this type of evacuation, which is highly undesirable from a public safety perspective, is an evacuation that occurs when fire ignites close to vulnerable communities. This type of situation is inherently dangerous because there is generally a higher threat to persons who are in a vehicle on a road when fire is burning in the immediate area than in a well-defended, ignition-resistant home. Conditions may become so poor that the vehicle drives off the road or crashes into another vehicle, and flames and heat overcome the occupants. A vehicle offers little shelter from a wildfire if the vehicle is situated near burning vegetation or catches fire itself. This type of evacuation must be considered a very undesirable situation by law and fire officials in all but the rarest situations where late evacuation may be safer than seeking temporary refuge in a structure (such as when there are no nearby structures, the structure[s] is/are already on fire, or when there is no other form of refuge). Temporary refuge would be possible within the newer Project structures that are built to ignition resistant levels, but some structures within surrounding communities, as previously discussed, are less may have a higher vulnerability to ignitions based on their older construction dates and the fire and building codes enforceable at that time.

The third potential type of evacuation is a hybrid of the first two. In cases where evacuation is in process and changing conditions result in a situation that is considered unsafe to continue evacuation, it may be advisable to direct evacuees to pre-planned temporary refuge locations, including their own home if it is ignition-resistant and defensible, such as those within Moon Camp Project. As with the second type of evacuation discussed above, this situation is considered

highly undesirable, but the evacuation pre-planning must consider these potential scenarios and prepare decision makers at the IC level and at the field level for enacting a contingency to evacuation when conditions dictate.

Indications from past fires and related evacuations, in San Bernadino County and throughout Southern California, which have experienced increasingly more frequent and larger fires, are that evacuations are largely successful, even with a generally unprepared populace. It then stands to reason that an informed and prepared populace would minimize the potential evacuation issues and related risk to levels considered acceptable from a community perspective.

Evacuation orders or notifications are often triggered based on established and pre-determined model buffers, which are based on topography, fuel, moisture content of the fuels and wind direction. Evacuations are initiated when a wildfire reaches or crosses one of these pre-determined buffers. Evacuations can also be very fluid. The IC, law enforcement and OES would jointly enact evacuations based on fire behavior.

6.2 Project Evacuation Baseline

For purposes of this Wildfire Evacuation Plan, the first and most logical choice for all of the occupants within the boundaries of Moon Camp Project is to adhere to the principles and practices of the "Ready, Set, Go!" Program previously mentioned in this document. As part of this program, it is important that educational and training programs, organized by Owner(s)/Property Manager, are available to all residents. In addition, it is imperative that the "Ready, Set, Go!" program information be reviewed on a routine basis along with the accompanying maps illustrating evacuation routes, temporary evacuation points and pre-identified evacuation points. It must be kept in mind that conditions may arise that will dictate a different evacuation route than the normal roads used on a daily basis.

Residents are urged to evacuate as soon as they are notified to do so or earlier if they feel uncomfortable. Directions on evacuation routes will be provided in most cases, but when not provided, residents of the Project will proceed according to known available routes away from the encroaching fire as detailed in the Quick Reference section of this WEP. Occupants are cautioned not to rely on navigation aid apps which may inadvertently lead them toward an oncoming fire. Depending on the type of emergency and the resulting evacuation, it could take approximately up to 1 hour and 39 minutes to complete an evacuation of the Project Area, based on road capacities and competing use of the roads by occupants from other areas.

Note: This Wildfire Evacuation Plan will require adjustment and continued coordination by the Owner(s) and/or Developer and/or Property Manager and fire/law enforcement agencies during each of the construction phases. With each phase, the evacuation routes may be subject to changes with the addition of both primary and secondary evacuation routes.

6.3 Civilian and Firefighter Evacuation Contingency

As of this document's preparation, no community in California has been directed to shelter-in- place during a wildland fire. This is not to say that people have not successfully sheltered-in-place during wildfire, where there are numerous examples of people sheltering in their homes, in hardened structures, in community buildings, in swimming pools, and in cleared or ignition-resistant landscape open air areas. The preference will always be early

evacuation following the "Ready, Set, Go!" model, but there exists the potential for unforeseen civilian evacuation issues, and having a contingency plan will provide direction in these situations that may result in saved lives.

Potential problems during wildfire evacuation from the Project area include:

- Inadequate time to safely evacuate;
- Fire evacuations during rush hour traffic or when large events are occurring;
- Blocked traffic due to accidents or fallen tree(s) or power pole(s);
- The need to move individuals who are unable to evacuate.

It is recommended that local law enforcement and fire agencies conduct concerted pre-planning efforts focusing on evacuation contingency planning for civilian populations when it is considered safer to temporary seek a safer refuge than evacuation. Moon Camp' structures would allow for the possibility of temporary sheltering while structures in surrounding communities would not typically be considered ignition-resistant and therefore, not appropriate for temporary refuge.

6.3.1 Safety Zones

The International Fire Service Training Association (IFTSA; Fundamentals of Wildland Fire Fighting, 3rd Edition) defines "safety zones" as areas mostly devoid of fuel, which are large enough to assure that flames and/or dangerous levels of radiant heat will not reach the personnel occupying them. Areas of bare ground, burned over areas, paved areas, and bodies of water can all be used as safety zones. The size of the area needed for a safety zone is determined by fuel types, its location on slopes and its relation to topographic features (chutes and saddles) as well as observed fire behavior. Safety zones should never be located in topographic saddles, chutes or gullies. High winds, steep slopes or heavy fuel loads may increase the area needed for a safety zone.

The National Wildland Fire Coordinating Groups (NWFCG), Glossary of Wildland Fire Terminology provides the following definitions for safety zones:

> *Safety Zone*. An area cleared of flammable materials used for escape in the event the line is outflanked or in case a spot fire causes fuels outside the control line to render the line unsafe. In firing operations, crews progress so as to maintain a safety zone close at hand allowing the fuels inside the control line to be consumed before going ahead. Safety zones may also be constructed as integral parts of fuel breaks; they are greatly enlarged areas, which can be used with relative safety by firefighters and their equipment in the event of blowup in the vicinity.

According to NWFCG, safety zone(s):

- Must be survivable without a fire shelter
- Can include moving back into a clean burn
- May take advantage of natural features (rock areas, water, meadows)
- Can include constructed sites (clear-cuts, roads, helispots)
- Are scouted for size and hazards
- Consider the topographic location (larger if upslope)

- Should be larger if downwind
- Should not include heavy fuels
- May need to be adjusted based on site-specific fire behavior

The definition for a safety zone includes provisions for separation distance between the firefighter and the flames of at least four times the maximum continuous flame height. Distance separation is the radius from the center of the safety zone to the nearest fuels.

The urbanized areas nearby the Project site offer the best possibility for a safety zone for firefighter use. The Moon Camp Project will also include the ability for firefighters to seek safety zones within the ignition-resistant landscapes, but identification of other potential safety zones will require additional focused study by SBCFD and other fire and law enforcement agencies.

6.3.2 Temporary Firefighter Refuge Areas

Firescope California (Firefighting Resources of Southern California Organized for Potential Emergencies) was formed by legislative action to form a partnership between all facets of local, rural, and metropolitan fire departments, CAL FIRE and federal fire agencies. Firescope defines a contingency plan when it is not possible to retreat to a safety zone. This contingency includes establishment of firefighter temporary refuge areas (TRAs), which are defined as:

> A preplanned area where firefighters can immediately take refuge for temporary shelter and short-term relief without using a fire shelter in the event that emergency egress to an established safety zone is compromised.

Examples of a TRA may include the lee side of a structure, inside of a structure, large lawn or parking areas, or cab of a fire engine, amongst others. Differences between a TRA and a Safety Zone is that TRAs are closer to the immediate firefighting area, are considered a contingency to being able to get to a safety zone, do not include a requirement for a large area set back four times the flame lengths of adjacent fuels, and cannot be feasibly pre-planned until firefighters arrive on-scene and size up the situation.

Firescope appropriately notes that although safety zones and viable escape routes shall always be identified in the WUI environment, they may not be immediately available should the fire behavior increase unexpectedly. Often a TRA is more accessible in the WUI environment. A TRA will provide temporary shelter and short-term relief from an approaching fire without the use of a fire shelter and allow the responders to develop an alternate plan to safely survive the increase in fire behavior.

The major difference between a TRA and a safety zone is that a TRA requires another planned tactical action; i.e., TRAs cannot be considered the final action, but must include self-defense and a move out of the area when the fire threat subsides. A TRA should be available and identified on site at a defended structure. TRAs are NOT a substitute for a safety zone. TRA pre-planning is difficult, at best because they are very site- and fire behavior-specific. For the existing uses, TRAs would likely include navigating into any of the within the more densely developed areas where firefighters would be separated from the unmaintained wildland fuels by wide areas including site-wide maintained landscapes, ignition-resistant structures, and wide roads that offer numerous opportunities for TRA.

The entire Project site would be developed and paved surfaces, such as the parking areas, are considered potential TRAs. This is an important concept because it offers last-resort, temporary refuge of firefighters, and in a worst-case condition, occupants. This approach would be consistent with Firescope California (2013), which indicates that firefighters must determine if a safe evacuation is appropriate and if not, to identify safe refuge for those who cannot be evacuated, including civilians.

Each of the Project site's structures that can be considered for TRA include the following features:

- Ignition-resistant construction
- Annual landscape inspections by 3rd party inspectors
- Wide roadways with fire hydrants
- Maintained landscapes and roadside fuel modification
- Ember-resistant vents
- Interior fire sprinklers

Because there is the possibility that evacuation of the Project and surrounding communities may be less safe than temporarily refuging on site, such as during a fast-moving, wind-driven fire that ignites nearby, including temporary refuge within some properly designed, constructed and maintained structures onsite is considered a contingency plan for the Moon Camp Project. This concept is considered a component of the "Ready, Set, Go!" model as it provides a broader level of "readiness" should the ability to execute an early evacuation be negated by fire, road congestion, or other unforeseen issues.

Note: This approach would be considered a last-resort contingency during wildfire with the primary focus being on early evacuation. The decision for evacuation or temporarily refuging on site will be made by responding law enforcement and/or fire personnel.

6.4 Social Aspects of Wildfire Evacuation

Orderly movement of people is the result of planning, training, education, and awareness, all of which are promoted in San Bernadino County. Evacuation has been the standard term used for emergency movement of people and implies imminent or threatening danger. The term in this Wildfire Evacuation Plan, and under the "Ready, Set, Go!" concept, indicates that there is a perceived threat to persons and movement out of the area is necessary, but will occur according to a pre-planned and practiced protocol, reducing the potential for panic.

Citizen reactions may vary during an evacuation event, although several studies indicate that orderly movement during wildfire and other emergencies is not typically unmanageable. Evacuation can be made even less problematic through diligent public education and emergency personnel training and familiarity. Social science research literature indicates that reactions to warnings follow certain behavior patterns that are defined by people's perceptions (Aguirre 1994; Drabek 1991; Fitzpatrick and Mileti 1994; Gordon 2006; Collins 2004) and are not unpredictable. In summary, warnings received from credible sources by people who are aware (or have been made aware) of the potential risk, have the effect of an orderly decision process that typically results in successful evacuation. This success is heightened when evacuations are not foreign to occupants (Quarantelli and Dynes 1977; Lindell and Perry 2004) as will occur within the Project area. Further, in all but the rarest circumstances, evacuees will be receiving information from credible sources during an evacuation. It would be anticipated that law enforcement and/or fire personnel would be on site to help direct traffic and would be viewed by evacuees as

knowledgeable and credible. The importance of training these personnel cannot be overstated and annual education and training regarding fire safety and evacuation events will be essential for successful future evacuations.

6.4.1 Evacuation of Special Populations

Vogt (1990 and 1991) defines special populations as those groups of people who, because of their special situations or needs, require different planning strategies from those of the general population. Special needs populations in Moon Camp Project include the hearing or visually impaired, foreign speaking, and temporary visitors such as customers or day workers.

6.4.3 Re-Entry Procedures

Although re-entry procedures were not identified within San Bernardino County emergency planning documents reviewed by the consultant, re-entry procedures generally incorporate the following actions.

An important component of evacuations is the citizen re-entry process. The County's EOP Re-Entry Protocol establishes guidance and procedures to ensure a coordinated, safe, and orderly re-entry into impacted communities following an incident.

The EOC Law Enforcement Branch will serve as the primary agency re-entry activities with support from other agencies including SBCSD, San Bernadino OES, Cal OES Law Enforcement Mutual Aid Region VI, ARC, VOAD, CHP, and more. In most cases, the EOC will remain activated until full re-entry is complete. In the event that the EOC has been deactivated, the IC or the Liaison Officer of the Incident Management Team will initiate re-entry procedures. The impacted areas must be thoroughly investigated to ensure it is safe for occupants to return and normal operations have been restored.

The public will be notified of the re-entry status through emergency broadcast radio, television, press releases, internet, TNES, Ready SB Alert App, community briefings, and informational updates at shelters. Once evacuees are permitted to return, it is important that procedures are established to properly identify occupants and critical support personnel, as well as ensure the legitimacy of contractors, insurance adjustors, and other personnel. Re-entry points should be staffed by law enforcement personnel.

INTENTIONALLY LEFT BLANK

7 Implementing Conditions

1. Moon Camp will designate a Fire Safety Coordinator(s) to oversee implementation of this WEP and overall fire coordination with BPD and SBCFD.
2. The Fire Safety Coordinator(s) will coordinate an annual fire evacuation drill/fire exercise to ensure proper safety measures have been implemented, facility awareness and preparation of a facility-wide **"Ready, Set, Go!"** plan. The Fire Safety Coordinator will also organize resident training and awareness through various practices:
    i. New hire fire awareness and evacuation training
    ii. Ongoing staff training
    iii. Facility sweeps by trained staff
    iv. Strategically placed fire safety and evacuation/sheltering protocol information, as determined by the Fire Safety Coordinator.
3. The Moon Camp Project will include a proactive facility wildfire education program utilizing a multi-pronged approach to fire safety following the **"Ready, Set, Go!"** approach to wildfire evacuation, to include, but not limited to:
    i. Annual wildfire and evacuation safety awareness meeting in coordination with local fire agencies.
    ii. Annual reminder notices will be provided to each resident encouraging them to review this WEP and be familiar with evacuation protocols.
    iii. The Project website will host a webpage dedicated to wildfire and evacuation education and awareness, which should include a copy of this Wildfire Evacuation Plan and the resources provided herein.
4. The Project includes a contingency plan for the rare occurrence that evacuation is not safe that includes residents sheltering in place within onsite structures.

8 Limitations

This Wildfire Evacuation Plan incorporates concepts and protocols consistent with industry standards and has been developed based on San Bernadino County wildfire and evacuation standards per the County's EOP documents and is specifically intended as a guide for evacuations for the Moon Camp Project. This Wildfire Evacuation Plan provides basic evacuation information that will familiarize residents of the Project with the evacuation route options that may be available to them during an emergency. However, because emergencies requiring evacuation have many variables and must be evaluated on a case-by-case basis, real-time law enforcement and fire personnel/agencies' decision-making and direction during an emergency requiring evacuation would supersede this WEP.

This WEP analyzes the existing community's evacuation times currently and with the proposed Moon Camp Project. The estimated evacuation times are based on several assumptions as detailed in this WEP. However, actual evacuation times may be faster or slower than the estimates, depending on the type of emergency, the extent of the evacuation, the time of day, and other factors. A collective, community–wide evacuation of existing populations and the proposed population from the Project would include congested roads in its existing condition that are improved, but still congested, with the Moon Camp Project. Congested roads are normal in any urban setting when a large evacuation is declared unless it is managed and evacuation areas are staggered to reduce the potential traffic surges that can significantly impact evacuations. Therefore, there would likely still be congestion and delays.

This Wildfire Evacuation Plan promotes the "Ready, Set, Go!" model, adopted by SBCFD, CAL FIRE, and many fire agencies statewide. The goal is to raise agency and citizen awareness of potential evacuation issues and get a majority of the public "Ready" by taking a proactive stance on preparedness, and evacuation planning efforts. The Moon Camp populace will be "Set" by closely monitoring the situation whenever fire weather occurs and/or when wildland fire occurs and elevating pre-planned protocol activities and situation awareness. Lastly, officials will implement the plan and mandate that populations "Go" by executing pre-planned evacuation procedures in a conservative manner (i.e., evacuation will occur based on conservative decision points, as proposed in this evacuation plan or when directed by fire and law enforcement personnel, whichever is more conservative). The preferred alternative will always be early evacuation. However, there may be instances when evacuation is not possible, is not considered safe, or is not an option based on changing conditions. For example, should a fire occur and make evacuation from the Project area ill advised, a contingency plan for residents should be available. This contingency would include moving people to pre-designated TRAs until it is safe to evacuate or the threat has been mitigated.

Ultimately, it is the intent of this Wildfire Evacuation Plan to guide the implementation of evacuation procedures such that the process of evacuating people from the Moon Camp Project is facilitated in an efficient manner and according to a pre-defined evacuation protocol as well as providing a contingency option of temporarily refuging onsite, if evacuation is considered less safe. The Project's residents should be aware of this Wildfire Evacuation Plan and components of it shall be posted on the Project's website. It is also recommended that the Owner(s)/Property Manager provide reminders to residents on at least an annual basis. This educational outreach will result in a populace that understands the potential for evacuations and the routes and options that may be presented to them.

During extreme fire weather conditions, there are no guarantees that a given structure will not burn or that evacuations will be successful all the time. Wildfires may occur in the area that could damage property or harm

persons. However, successful implementation of the procedures outlined in this Wildfire Evacuation Plan will provide for an informed populace regarding evacuations.

This WEP does not provide a guarantee that all persons will be safe at all times because of the procedures discussed. There are many variables that may influence overall safety. This WEP provides a summary for implementation of standard evacuation protocols and public outreach, which should result in reduced wildfire related risk and hazard. Even then, fire can compromise the procedures through various, unpredictable ways. The goal is to reduce the likelihood that the system is compromised through implementation of the elements of this WEP and regular occurring program maintenance and updates.

It is recommended that the evacuation process is carried out with a conservative approach to fire safety. This approach must include embracing a "Ready, Set, Go!" stance on evacuation. Accordingly, evacuation of the wildfire areas should occur as soon as they receive notice to evacuate, which may vary depending on many environmental and other factors. Fire is a dynamic and somewhat unpredictable occurrence, and it is important for anyone living at the wildland-urban interface to educate themselves on practices that will improve safety.

Limitations

The underlying planning principle for fire preparedness, given the dynamic nature of a fire, is to demonstrate the availability of multiple route alternatives and response strategies to permit emergency professionals to manage their response according to the specific circumstances. The Study Area provides ample route and response alternatives. Emergency responders will coordinate the safest possible evacuation based on the dynamic circumstances of the actual event, including the appropriate phasing of the evacuation, and utilization of the most appropriate ingress and egress routes for area residents and emergency responders.

The breadth of route alternatives and response strategies available to emergency professionals to manage a potential fire in this region cannot and should not be evaluated using the CRA's Evacuation Analysis – Technical Memorandum alone. A comprehensive view of Project fire safety is gained by understanding this memo, the Project's Wildfire Evacuation Plan, along with the standard protocols and "in-the-field" decision making of emergency responders.

This Wildfire Evacuation Plan presents a reasonable vehicle travel time estimate based on professional judgments made by CRA with input from Dudek. Changing any number of these assumptions can lengthen or shorten the average vehicle travel time.

For instance, a situation could arise in which professionals *may* choose to utilize additional roadways for evacuation not utilized in the Dudek/CRA analysis and *may also* choose to send more vehicle trips to certain evacuation routes, and *may also* choose to guide vehicle trips to more or different route permutations relative to what has been modeled in this the Dudek/CRA analysis.

The net result of changing the variables selected could yield an average evacuation travel time shorter or longer than the results detailed in the Dudek/CRA analysis. Many factors can shorten or lengthen the vehicle time from the results shown herein. For example:

1. Changing the possible evacuation routes selected would affect the results. For instance, utilizing roads for ingress and/or egress that are not utilized in this analysis could shorten vehicle travel times relative to the results shown herein.

2. Increasing or decreasing the number of path permutations and percentage of the population utilizing each route that leads out of the immediate area could shorten or lengthen vehicle travel time relative to the results shown herein.
3. Emergency professionals electing to reserve certain road lanes for emergency vehicle ingress for portions of time could affect the travel time relative to the results shown herein.
4. Assuming evacuees utilize fewer or more vehicles to evacuate from the Project or surrounding communities relative to the Vehicle Utilization Rate selected in the analysis would shorten or lengthen vehicle travel time relative to the results shown herein.
5. Changing the mix of vehicle trips allocated to each evacuation route could shorten or lengthen vehicle travel time relative to the results shown herein.
6. Assuming a different road capacity adjustment factor could shorten or lengthen the vehicle travel time relative to the results shown herein.
7. Assuming fewer people are at home when the evacuation notice is given would reduce the number of vehicle trips and shorten vehicle travel time relative to the results shown herein. For instance, an evacuation during daytime hours would typically result in fewer outbound trips than assumed in this analysis.
8. Assuming some portion of vehicle trips are made in advance of the evacuation notice would reduce the number of vehicle trips relative to the results shown herein.
9. Assuming some homeowners and their families are not in the Study Area when evacuation notice is given (most likely in a daytime evacuation event), could reduce the number for vehicle trips relative to the results shown herein.

9 References

Aguirre, D.B. 1994. Planning warning evacuation, and search and rescue: A review of the social science research literature. College Station, TX. Texas A&M University, Hazard Reduction Recovery Center.

Collins, S. L. 2004. Evaluation of Evacuation Planning in Wildland-Urban Interface Environments: Executive Analysis of Fire Service Operations in Emergency Management. Applied Research project submitted to the National Fire Academy as part of the Executive Fire Officer Program. 44 pp.

Cova, T.J., P.E. Dennison, and F.A. Drews. 2011. "Modeling evacuate versus shelter-in-place decisions in wildfires." Sustainability, 3(10): 1662-1687. Published, 09/30/2011. http://www.mdpi.com/2071-1050/3/10/1662/.

Drabek, T.E. 1991. "Anticipating organizational evacuations: disaster planning by managers of tourist-oriented private firms." International Journal of Mass Emergencies and Disasters. 9, (2), 219–245.

Fitzpatrick, C. and D.S. Mileti. 1994. "Public Risk Communication." In Disasters, Collective Behavior, and Social Organization. Dynes R. R. and Tierney, K.J. (Eds). 1994. Newark University of Delaware Press, 71–98.

Gordon, R. 2006. "Acute Responses to Emergencies: findings and observations of 20 years in the field." The Australian Journal of Emergency Management, Vol. 21, No. 1, February 2006. 23 pp.

FEMA. 2008. Mass Evacuation Incident Annex. Federal Emergency Management Agency. 20 pp. Firescope 2013. International Fire Chiefs Association. "Ready, Set, Go!" website link: http://wildlandfirersg.org/.

Lindell, M.K. and R.W. Perry. 2004. Communicating Environmental Risk in Multiethnic Communities. Thousand Oaks, California: Sage Publications.

Quarantelli, E.L. and R.R. Dynnes. 1977. "Response to social crisis and disasters." Annual Review of Sociology. 3, 23–49.

San Bernadino County OES, 2018. Emergency Operations Plan.

San Bernadino County, 2022. Multi-Jurisdictional Hazard Mitigation Plan.

Sorensen, J., and B.Vogt. 2006. Interactive Emergency Evacuation Guidebook. Prepared for the Protective Action IPT – Chemical Stockpile Emergency Preparedness Program.

Vogt, B. 1990. Evacuation Of Institutionalized And Specialized Populations, ORNL/SUB-7685/1 & T23. Oak Ridge, TN: Oak Ridge National Laboratory.

Vogt, B. 1991. "Issues in nursing home evacuations." International Journal of Mass Emergencies and Disasters, 9, 247–265.

Wolshon B. and E. Marchive. 2007. “Planning in the Urban Wildland Interface: Moving Residential Subdivision Traffic During Wildfires.” ASCE J. Urban Plann. Dev. – Special Emergency Transportation Issue. 133(1) 73–81.

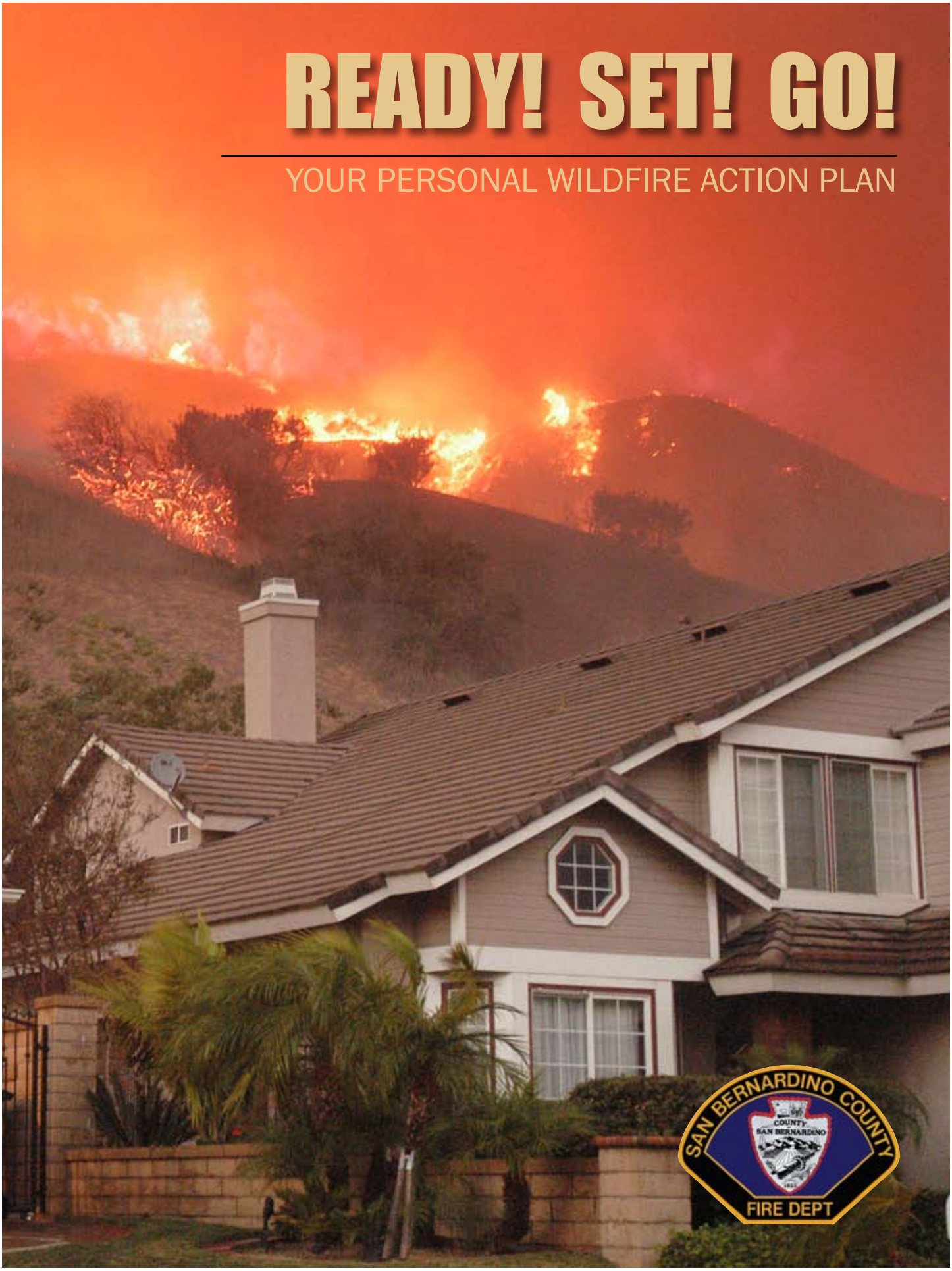
INTENTIONALLY LEFT BLANK

Appendix A1

"Ready, Set, Go!" Wildfire Action Plan

READY! SET! GO!

YOUR PERSONAL WILDFIRE ACTION PLAN



READY! SET! GO!

Wildfire Action Plan

Saving Lives and Property through Advance Planning

Dear Resident,

San Bernardino County is one of the most beautiful places to live, but for those living in what are called “urban interface areas,” it does not come without risks. Fire is, and always has been, a natural part of this landscape. Many of us have chosen to live in brush-covered canyons and on hillsides which have historically burned long before homes were built. The fire season is now year-round, requiring firefighters and residents to constantly be on heightened alert for the threat of wildfire.

The San Bernardino County Fire Department takes every precaution to help protect you and your property from wildfire. In the event of a major wildfire, however, firefighting resources will be stretched. This reality requires you to take personal responsibility for protecting yourself, your family, and your property.

We have published this Ready, Set, Go! Personal Wildfire Action Plan to give you the tips and tools to successfully prepare for a wildfire. It will give you guidance on retrofitting your home with fire-resistive features. It will help you create the necessary defensible space around your home. This publication will help you prepare your home, yourself, and your family so that you can leave early, well ahead of a fast-approaching wildfire.

In San Bernardino County, wildfires are often fueled by dry vegetation and driven by hot, dry “Santa Ana” winds, making them extremely dangerous and impossible to control. However, many residents have built their homes and landscaped without fully understanding the impact that a wildfire could have on them. Few have adequately prepared their families for a quick evacuation. Many don’t fully know the potential consequences of choosing to ignore an evacuation order until it is too late. We always recommend that you comply with any evacuation orders resulting from wildfire.

It’s not a question of “if” but “when” the next major wildfire will occur in San Bernardino County. That’s why the most important person in protecting your life and property is not the firefighter, but yourself. Through advance planning and preparation, we can all be ready for the next wildfire. I hope that you find the tips included in this publication helpful in creating heightened situational awareness and a more fire-safe environment for you and your family.

Stay safe,

Your San Bernardino County Fire Chief

INSIDE

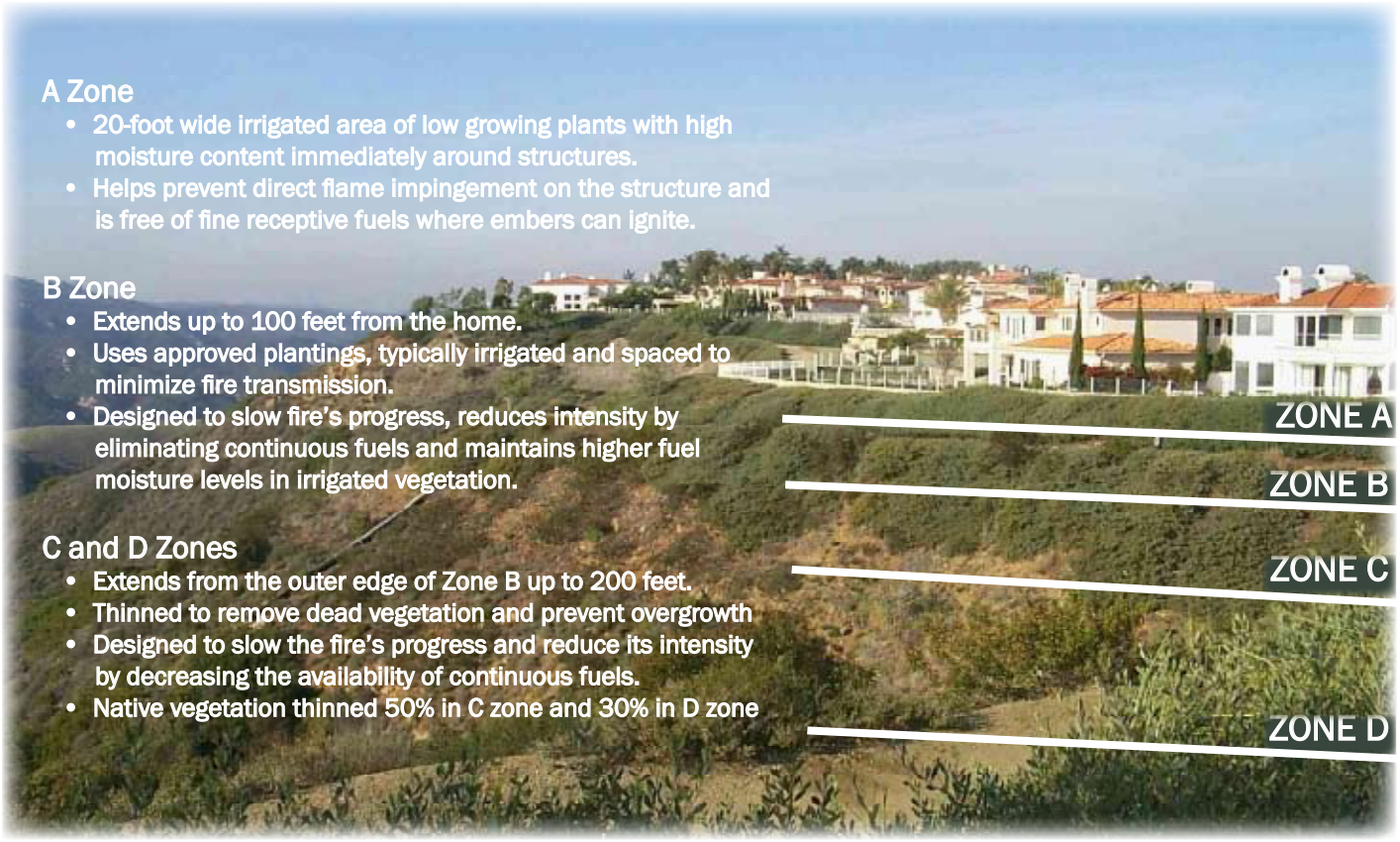
Ready! Set! Go! is also supported by:

Get READY - Create a Defensible Home

A defensible home is a home that has the greatest potential for surviving a wildfire. Defensible homes are those homes that are in compliance with the County of San Bernardino Brush Clearance requirements or have been through the Fire Department's Fuel Modification Program and have been constructed in accordance with the latest building standards for the fire zones.

What is Fuel Modification ?

The Fuel Modification Program affects new structures and developments built in the high fire hazard areas. A plan is approved by the Fire Department that helps protect homes and neighborhoods by requiring vegetation planted in zones around structures to be selected from an approved list and identifies areas that require brush clearance or thinning.



What is Defensible Space ?

Defensible space is the required space between a structure and the wildland area that, under normal conditions, creates a sufficient buffer to slow or halt the spread of wildfire to a structure. It protects the home from igniting due to direct flame impingement and radiant heat. Compliance is essential for structure survivability during wildfire conditions.

ZONE 1

Extends 30 feet out from buildings, structures, decks, etc.

- Remove all dead or dying vegetation
- Trim tree canopies regularly to keep their branches a minimum of 10 feet from structures and other trees
- Remove leaf litter (dry leaves / pine needles) from yard, roof, and rain gutters
- Relocate woodpiles or other combustible materials into Zone 2
- Remove combustible material and vegetation from around and under decks
- Remove or prune vegetation near windows
- Remove “ladder fuels” (low-level vegetation that allows the fire to spread from the ground to the tree canopy). Create a separation between low-level vegetation and tree branches. This can be done by reducing the height of low-level vegetation and/or trimming low tree branches.

ZONE 2

Extends 30 - 100 feet out from buildings, structures, and decks. Reduce the continuity of fuels by removing dead material and removing and/or thinning vegetation. Minimum spacing between vegetation is 3 times the dimension of the plant.

- Remove “ladder fuels”
- Cut or mow annual grass down to a maximum height of 4 inches
- Trim tree canopies regularly to keep their branches a minimum of 10 feet from other trees

What is a "Hardened" Home ?

The ability of your home to survive wildfire depends on its construction materials and the quality of the "defensible space" surrounding it. Embers from a wildfire will find the weak link in your home's fire protection scheme and gain the upper hand because of a small, overlooked or seemingly inconsequential factor. However, there are measures you can take to safeguard your home from wildfire. While you may not be able to accomplish all of the measures listed below, each will increase your home's, and possibly your family's, safety and survival during a wildfire.

ROOFS
A roof is the most vulnerable surface for embers to land, lodge and start a fire; this includes roof valleys, open ends of barrel tiles, and rain gutters.

EAVES
Embers gather under open eaves and ignite exposed wood or other combustible material.

VENTS
Embers enter the attic or other concealed space and ignite combustible materials. Vents in eaves and cornices are particularly vulnerable, as are any unscreened vents.

WALLS
Combustible siding or other combustible or overlapping materials provide a surface and crevice for embers to nestle and ignite.

WINDOWS & DOORS
Embers can enter gaps in doors, including garage doors. Plants or combustible storage near windows can be ignited from embers and generate heat that can break windows and/or melt combustible frames.

BALCONIES & DECKS
Embers collect in or on combustible surfaces or undersides of decks and balconies, ignite the material, and enter the home through walls or windows.

ADDED PROTECTION
Consider protecting your home with a residential fire sprinkler system. In addition to extinguishing a fire started by an ember that enters your home, it also protects you and your family 24/7, year-round, from any fire that may start in your home, not just wildfire.

Tour a Wildfire Ready Home

Home Site and Yard: Ensure that you have at least a 100-foot radius of defensible space (cleared vegetation) around your home. Note that even more clearance may be needed for homes in severe hazard areas. This means looking past what you own to determine the impact a common slope or neighbor's yard will have on your property during a wildfire.

Cut dry weeds and grass before noon when temperatures are cooler to reduce the chance of sparking a fire.

Landscape with fire-resistant plants with high moisture content and are low-growing.

Keep woodpiles, propane tanks and combustible materials away from your home and other structures, such as garages, barns, and sheds.

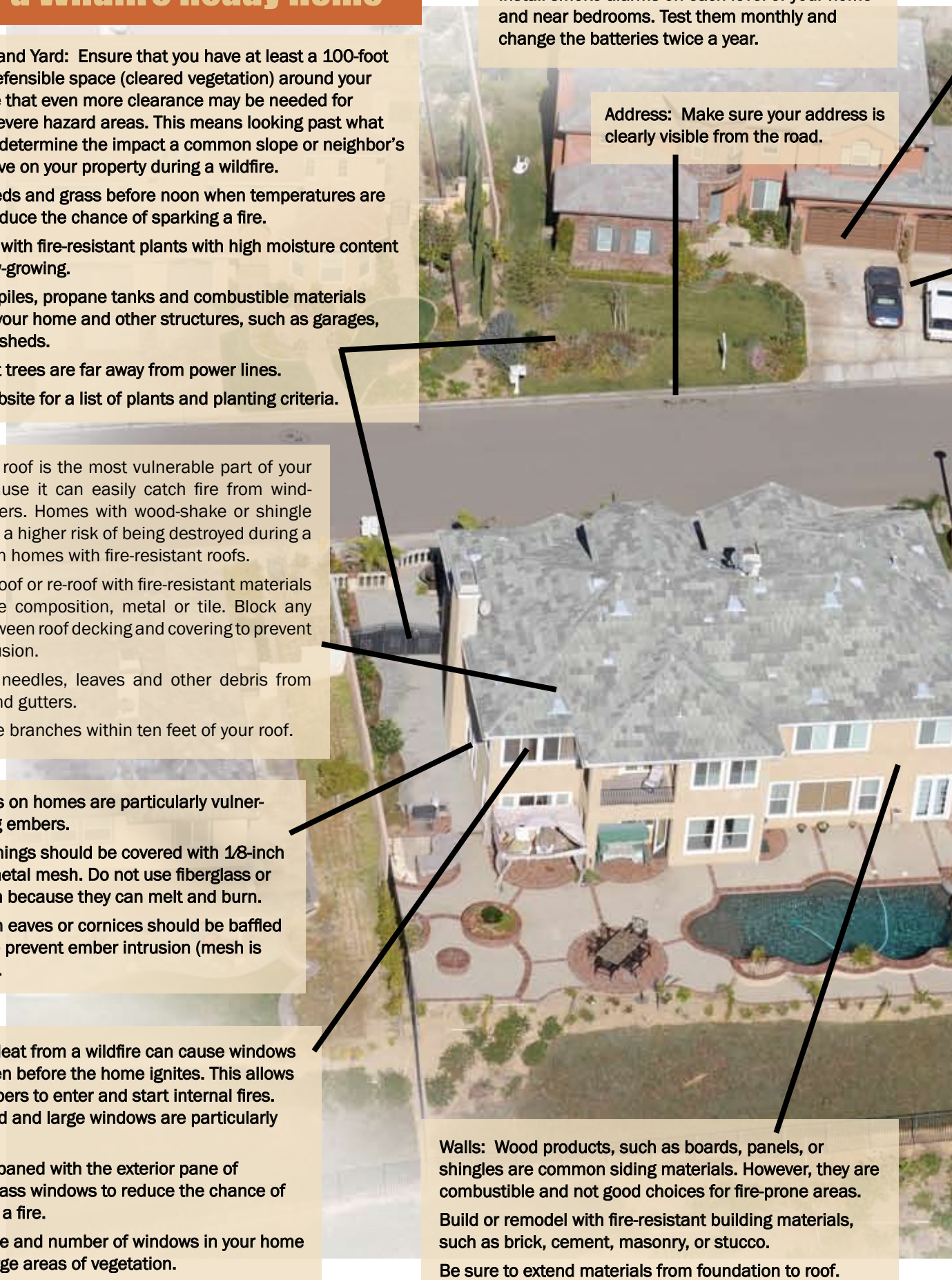
Ensure that trees are far away from power lines.

See our website for a list of plants and planting criteria.

Inside: Keep working fire extinguishers on hand.

Install smoke alarms on each level of your home and near bedrooms. Test them monthly and change the batteries twice a year.

Address: Make sure your address is clearly visible from the road.



Roof: Your roof is the most vulnerable part of your home because it can easily catch fire from wind-blown embers. Homes with wood-shake or shingle roofs are at a higher risk of being destroyed during a wildfire than homes with fire-resistant roofs.

Build your roof or re-roof with fire-resistant materials that include composition, metal or tile. Block any spaces between roof decking and covering to prevent ember intrusion.

Clear pine needles, leaves and other debris from your roof and gutters.

Cut any tree branches within ten feet of your roof.

Vents: Vents on homes are particularly vulnerable to flying embers.

All vent openings should be covered with 1/8-inch or smaller metal mesh. Do not use fiberglass or plastic mesh because they can melt and burn.

Attic vents in eaves or cornices should be baffled or otherwise prevent ember intrusion (mesh is not enough).

Windows: Heat from a wildfire can cause windows to break even before the home ignites. This allows burning embers to enter and start internal fires. Single-paned and large windows are particularly vulnerable.

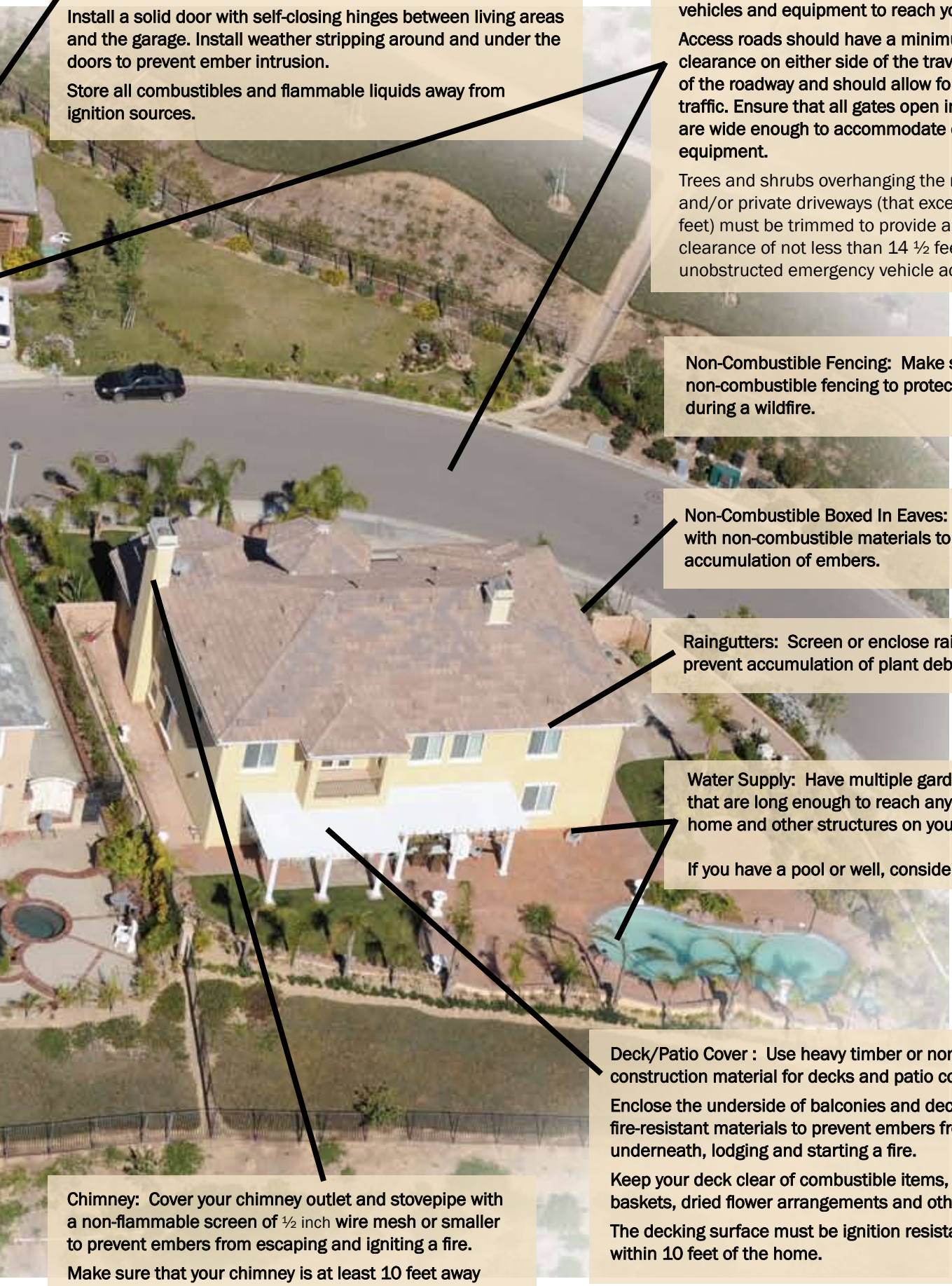
Install dual-paned with the exterior pane of tempered glass windows to reduce the chance of breakage in a fire.

Limit the size and number of windows in your home that face large areas of vegetation.

Walls: Wood products, such as boards, panels, or shingles are common siding materials. However, they are combustible and not good choices for fire-prone areas.

Build or remodel with fire-resistant building materials, such as brick, cement, masonry, or stucco.

Be sure to extend materials from foundation to roof.



Garage: Have a fire extinguisher and tools such as a shovel, rake, bucket, and hoe available for fire emergencies.

Install a solid door with self-closing hinges between living areas and the garage. Install weather stripping around and under the doors to prevent ember intrusion.

Store all combustibles and flammable liquids away from ignition sources.

Driveways and Access Roads: Driveways should be designed to allow fire and emergency vehicles and equipment to reach your house.

Access roads should have a minimum 10-foot clearance on either side of the traveled section of the roadway and should allow for two-way traffic. Ensure that all gates open inward and are wide enough to accommodate emergency equipment.

Trees and shrubs overhanging the road and/or private driveways (that exceed 150 feet) must be trimmed to provide a vertical clearance of not less than 14 ½ feet to allow for unobstructed emergency vehicle access.

Non-Combustible Fencing: Make sure to use non-combustible fencing to protect your home during a wildfire.

Non-Combustible Boxed In Eaves: Box in eaves with non-combustible materials to prevent accumulation of embers.

Raingutters: Screen or enclose raingutters to prevent accumulation of plant debris.

Water Supply: Have multiple garden hoses that are long enough to reach any area of your home and other structures on your property.

If you have a pool or well, consider a pump.

Deck/Patio Cover : Use heavy timber or non-flammable construction material for decks and patio covers.

Enclose the underside of balconies and decks with fire-resistant materials to prevent embers from blowing underneath, lodging and starting a fire.

Keep your deck clear of combustible items, such as baskets, dried flower arrangements and other debris.

The decking surface must be ignition resistant if it's within 10 feet of the home.

Chimney: Cover your chimney outlet and stovepipe with a non-flammable screen of ½ inch wire mesh or smaller to prevent embers from escaping and igniting a fire.

Make sure that your chimney is at least 10 feet away from any tree branches.

Create Your Own Wildfire Action Plan

Your Wildfire Action Plan must be prepared with all members of your household well in advance of a fire.

Use these checklists to help you prepare your Wildfire Action Plan.

Each family's plan will be different, depending on their situation.

Once you finish your plan, rehearse it regularly with your family and keep it in a safe and accessible place for quick implementation.

Get SET - Prepare Your Family

CERT COMMUNITY EMERGENCY RESPONSE TEAM

- ☐ **Create a Family Disaster Plan that includes** meeting locations and communication plans, and rehearse it regularly. Include in your plan the evacuation of large animals, such as horses.
- ☐ Have fire extinguishers on hand and train your family how to use them.
- ☐ Ensure that your family knows where your gas, electric and water main shut-off controls are and how to use them.
- ☐ Plan several different escape routes.
- ☐ Designate an emergency meeting location outside of the fire hazard area.
- ☐ Assemble an emergency supply kit as recommended by the American Red Cross.
- ☐ Appoint an out-of-area friend or relative as a point of contact so that you can communicate with family members who have relocated.
- ☐ Maintain a list of emergency contact numbers posted near your phone and in your emergency supply kit.
- ☐ Keep an extra emergency supply kit in your car in case you can't get to your home because of fire.
- ☐ Have a portable radio or scanner so that you can stay updated on the fire.

As the Fire Approaches

- [ ] Alert family and neighbors.
- [ ] Dress in appropriate clothing (i.e., clothing made from natural fibers, such as cotton, and work boots). Have goggles and a dry bandana or particle mask handy.
- [ ] Ensure that you have your brush fire survival kit on hand that includes necessary items, such as a battery-powered radio, spare batteries, emergency contact numbers, and ample drinking water.
- [ ] Stay tuned to your TV or local radio stations for updates, or check the Fire Department website at www.sbcfire.org
- [ ] Until you evacuate, remain close to your house, drink plenty of water and keep an eye on your family and pets.

OUTDOOR CHECKLIST

- [ ] Gather up flammable items from the exterior of the house and bring them inside (e.g., patio furniture, children's toys, doormats, etc.) or place them in your pool.
- [ ] Turn off propane tanks.
- [ ] Connect garden hoses to outside taps.
- [ ] Don't leave sprinklers on or water running - they can waste critical water pressure.
- [ ] Leave exterior lights on.
- [ ] Back your car into the garage. Shut doors and roll up windows.
- [ ] Have a ladder available.
- [ ] Patrol your property and extinguish all small fires.
- [ ] Seal attic and ground vents with pre-cut plywood or commercial seals.

INDOOR CHECKLIST

- [ ] Shut all windows and doors, leaving them unlocked.
- [ ] Remove flammable window shades and curtains and close metal shutters.
- [ ] Remove lightweight curtains.
- [ ] Move flammable furniture to the center of the room, away from windows and doors.
- [ ] Shut off gas at the meter. Turn off pilot lights.
- [ ] Leave your lights on so firefighters can see your house under smoky conditions.
- [ ] Shut off the air conditioning.

IF YOU ARE TRAPPED: SURVIVAL TIPS

- [ ] Shelter away from outside walls.
- [ ] Patrol inside your home for spot fires and extinguish them.
- [ ] Wear long sleeves and long pants made of natural fibers such as cotton.
- [ ] Stay hydrated.
- [ ] Ensure you can exit the home if it catches fire (remember if it's hot inside the house it is four to five times hotter outside).
- [ ] After the fire has passed, check your roof and extinguish any fires, sparks or embers.
- [ ] Check inside the attic for hidden embers.
- [ ] Patrol your property and extinguish small fires.
- [ ] If there are fires that you cannot extinguish with a small amount of water or in a short period of time, call 9-1-1.

GO Early

By leaving early, you will give your family the best chance of surviving a wildfire. You also help firefighters by keeping roads clear of congestion, enabling them to move more freely and do their job.

Make a Kit

- Keep a pair of old shoes and a flashlight handy for a night evacuation.
- Keep the six "**P**'s" ready, in case an immediate evacuation is required:
  - **P**eople and pets
  - **P**apers, phone numbers, and important documents
  - **P**rescriptions, vitamins, and eyeglasses
  - **P**ictures and irreplaceable memorabilia
  - **P**ersonal computers (information on hard drive and disks)
  - "**P**lastic" (credit cards, ATM cards) and cash

WHEN TO LEAVE

Leave early enough to avoid being caught in fire, smoke, or road congestion. Don't wait to be told by authorities to leave. In an intense wildfire, they may not have time to knock on every door. If you are advised to leave, don't hesitate!

WHERE TO GO

Leave to a predetermined location (it should be a low-risk area, such as a well-prepared neighbor or relative's house, a Red Cross shelter or evacuation center, motel, etc.)

HOW TO GET THERE

Have several travel routes in case one route is blocked by the fire or by emergency vehicles and equipment. Choose an escape route away from the fire.

WHAT TO TAKE

Take your emergency supply kit containing your family and pet's necessary items, such as cash, water, clothing, food, first aid kits, medications, and toys. Also, don't forget valuables, such as your computer, photos, and important documents.

Organize your family members and make arrangements for your pets.

Write up your Wildfire Action Plan and post it in a location where every member of your family can see it. Rehearse it with your family.

My Personal Wildfire Action Plan

During High Fire Danger days in your area, monitor your local media for information on brush fires and be ready to implement your plan. Hot, dry, and windy conditions create the perfect environment for a wildfire.

Important Phone Numbers

Emergency: _____ _____ _____

_____ _____ _____

School: _____ _____ _____

_____ _____ _____

Family: _____ _____ _____

_____ _____ _____

Friends: _____ _____ _____

_____ _____ _____

Animal Shelter: _____

_____

When to go: _____

_____

Where to go: _____

_____

How to get there: _____

_____ Destination: _____

What to take: ☐ Insurance Papers ☐ Photos ☐ Prescriptions ☐ Important Documents

_____

Who to tell (before and after): _____

San Bernardino County Fire Department
If you have an emergency, call **911**
Public Information Office **(909) 387-5950**
Web site: **www.sbcfire.org**

Ready! Set! Go!

TO REPORT AN EMERGENCY, CALL

9-1-1

San Bernardino County
Fire Incident Information Line

(909) 355-8800

During an emergency tune to your local EAS radio broadcast stations listed below or a station in your area.

93.3 FM	**KBHR**	**Big Bear Valley**
95.1 FM	**KFRG**	**High Desert/Valley**
98.9 FM	**KHWY**	**High Desert**
102.3 FM	**KZXY**	**Victor Valley**
107.7 FM	**KCDZ**	**Yucca Valley/Joshua Tree**
1620 AM		**CalTrans Information Station**

Photo by Troy Whitman - Southern California Edison

Appendix B

San Bernadino County OES Family Evacuation Planning Brochure

PETER R. HILLS, FIRE CHIEF

STEPS TO DEVELOPING YOUR EVACUATION PLAN

GARY PENROD, SHERIFF

San Bernardino County
Office of Emergency Services
(909) 356-3998

Family Evacuation Planning

Where will your family be when disaster strikes?

How will you find each other? Will you know if your children are safe?

Disasters can strike quickly and without warning. It can force you to evacuate your neighborhood or confine you to your home. What would you do if basic services including water, gas, electricity or telephones were cut off? Local officials and relief workers will be on the scene after a disaster, but they cannot reach everyone right away.

Families can and do cope with disasters by preparing in advance and working together as a team. Follow the steps listed in this brochure to create your family's disaster plan. Knowing what to do is for your protection and is your responsibility.

Various agencies such as the County Fire Department, the Sheriff, County Animal Care and Control, and the Red Cross partner together to facilitate your safe evacuation.

SPECIAL POPULATIONS

Do you know a senior or someone with a disability?

- Seniors and people with disabilities that are self-sufficient under normal circumstances may have to receive help of others in a disaster.
- Create a self help network of relatives, friends, and coworkers to assist in an emergency.
- Wear medical alert tags and bracelets to identify your disability in case of an emergency.
- If you have a severe speech, language, or hearing disability: keep on hand a writing pad and pencil to communicate with others.

EVACUATION ROUTES

- Residents should be familiar with all routes that lead in and out of their area.
- It is difficult to predetermine evacuation routes. Many factors such as the type of incident, location and weather conditions play a critical role in the selection of evacuation routes.
- Use travel routes specified by local authorities. Do not use off- road shortcuts when evacuating a National Forest Area. The National Forest could have these roads closed and you could be trapped by locked gates.

SHELTER TYPES

There are two types of shelters:

1. Evacuation Centers, which are for short-term sheltering.
2. Red Cross shelters, which are for long-term sheltering.

You may also be told to "shelter in place" if conditions warrant. This involves staying in your home/business with doors and windows closed.

ANIMALS

Many pets are injured or killed every year because no provisions were made for them in family disaster plans. The time to contact animal shelters for information on caring for pets during emergencies is before disaster strikes. Public emergency shelters often exclude pets for space and health reasons.

EVACUATION

Evacuate immediately if told to do so:

- Local Government agencies have developed plans to coordinate evacuations.
- Obey orders from law enforcement and fire officers. Your failure to evacuate could jeopardize your family and emergency responder safety. Lives take priority over property.
- Load your "important stuff" (important documents, photographs, medications, etc.) and Emergency Supply Kit into your car. Load pets at the last minute when the family leaves.

EVACUATION CON'T

You have been asked to leave:

- Drive with your headlights on for visibility.
- Drive calmly with special attention to public safety vehicles.

Do not attempt to re-enter the area until officials declare it safe for re-entry.

And if there's time...

- Be sure that all windows and doors are closed.
- Close metal window blinds.
- Lock your home.
- Cluster lawn furniture and other things that might snag firefighter hose lines.
- Remove light curtains and other combustibles from windows.
- Leave exterior lights on. It helps firefighters find the house in the smoke.
- Don't leave garden sprinklers on, they can waste critical water pressure.
- Shut off water, gas, and electricity before leaving, if instructed to do so.
- Post a note telling others when you left and where you are going.
- Listen to your battery-powered radio and follow the instructions of local emergency officials.
- Wear protective clothing and sturdy shoes.
- Take your family disaster supplies kit.

Emergency Alert System

The EAS is a warning system to provide the public with immediate messages that affect life and property. EAS is a way to provide emergency information quickly by radio, television, and cable licensees to the public. During an emergency tune to your local EAS radio broadcast stations listed below or a station in your area.

93.3 FM	**KBHR**	**Big Bear Valley**
95.1 FM	**KFRG**	**High Desert/Valley**
98.9 FM	**KHWY**	**High Desert**
102.3 FM	**KZXY**	**Victor Valley**
107.7 FM	**KCDZ**	**Yucca Vly/Joshua Tree**
1620 AM	**CalTrans Information Station**	

Additional information available at:
www.fema.gov
www.oes.ca.gov
www.redcross.org

THREE STEPS TO SAFETY

1) Create a disaster plan:

Meet with your family and discuss why you need to prepare for a disaster. Explain the dangers of fire, severe weather and earthquakes to children. Plan to share responsibilities and work together as a team.

❒ Discuss the types of disasters that are most likely to happen. Explain what to do in each case.

❒ Pick two places to meet:

1. Right outside your home in case of an emergency, like a fire.

2. Outside your neighbor- hood in case you can't return to your home.

Everyone must know their address and phone number.

❒ Ask an out of state friend to be your "family contact." After a disaster, it's often easier to call long distance. Other family members should call this person and tell them where they are. Everyone must know your contact's phone number.

2) Complete this checklist:

❒ Post emergency telephone numbers by phone (fire, police, ambulance, etc.).

❒ Teach children how and when to call 911 or your local Emergency Services number for emergency help.

❒ Show each family member how to turn off the water, gas and electricity at the main switches.

❒ Teach each family member how to use a fire extinguisher (ABC type), and show them where it is kept.

❒ Install smoke detectors of each level of your home, especially near bedrooms.

❒ Stock emergency supplies and assemble a Disaster Supplies Kit.

❒ Determine the best escape routes from your home. Find two ways out of each room.

❒ Find the safe spots in your home for each type of disaster.

❒ Second story homes should have a ladder for escape and know how to use it.

3) Practice and maintain your plan:

❒ Quiz your kids every six months so they remember what to do.

❒ Conduct fire and emergency evacuation drills.

Year	Drill Date
_____	_____
_____	_____
_____	_____

❒ Replace stored water every three months and stored food every six months.

❒ Test and recharge your fire extinguisher(s) according to manufacturer's instructions.

❒ Test your smoke detectors monthly and change batteries at least once a year.

Jan.	❒	July	❒
Feb.	❒	Aug.	❒
Mar.	❒	Sep.	❒
Apr.	❒	Oct.	❒
May	❒	Nov.	❒
June	❒	Dec.	❒

Change batteries in _____ (month) each year.

Appendix C
Evacuation Modeling Results

TO:	Kaitlyn Dodson-Hamilton; Tom Dodson & Associates
FROM:	Phuong Nguyen, PE; CR Associates (CRA)
DATE:	September 26, 2023
RE:	Moon Camp Fire Evacuation Analysis – Technical Memorandum

The purpose of this technical memorandum is to assess the time required for emergency evacuation under several scenarios, assuming a wind-driven fire that results in an evacuation affecting the First Moon Camp Project ("Project") and surrounding communities.[1] The following discussion of evacuation traffic simulations is not intended to be an Evacuation Plan, nor include elements typically found in an Evacuation Plan. The sole purpose of the traffic simulations is to focus on the vehicle travel times in simulated evacuation events.

Background and Purpose

This memorandum provides a summary of the traffic simulations conducted for evacuation of the Project and surrounding community due to a wildfire. The simulations have been conducted for a variety of evacuation scenarios described below. Modeling potential evacuation traffic impacts requires that numerous assumptions be made to address many variables that will impact a real-life evacuation scenario, including the number of existing vehicles in the community, the number of Project vehicles that will need to evacuate, the roadway capacities and whether enhancements are provided (e.g., extra lanes, lane widening, signaling intersections), the total number of intersections and how they will be operating, the final destination, the targeted evacuation area, the total mobilization time, vegetation communities, weather and wind, fire spread rates, humidity, topography, risk to homes, locations of ignitions and new fire starts, and lead time needed, etc. There are many hundreds or thousands of potential model scenarios, and every fire scenario poses variations that regularly change and are reassessed "real-time" during a wildfire. Agencies involved in implementing an evacuation order would not rely on a project-specific evacuation plan, but on situational awareness and agency created wildfire pre-plans, which act as operational tools to provide high-level fire assessments and assets at risk, preferred evacuation approaches, and safety information to inform evacuation decision-making.

The following analysis is intended to present representative evacuation scenarios using available information, conservative assumptions, and an industry based modeling technology. In an actual emergency, unified command will take into account numerous factors including fire location and spread rates, wind speeds and direction, humidity, topography, fuel loading, emergency access routes, evacuation routes, shelter-in-place options, time needed to evacuate, and other variables, and will issue specific evacuation or shelter-in-place directives consistent with the process and protocols outlined in the County's Emergency Operations Plans. During a wildfire, nearby residents and the Project's residents should comply with those directives from authorities and first responders conducting the evacuation or emergency response. The evacuation traffic model used herein is appropriate for planning and comparison purposes but will likely not be relied on by first responders and should not be relied on by Incident Commander in time of an emergency; however, it provides useful information that will be provided to agencies and emergency managers and may inform strategic response plans in terms of evacuation timeframes and contingency options.

The roadway network and vehicle input assumptions also have been selected to simulate a "worst-case" evacuation scenario that would occur during a weekend day (Saturday) when the Project's

[1] This memorandum was prepared with technical fire behavior input from Dudek's fire protection planning team.

residents are home, nearby vacation homes are likely to be fully occupied, and full occupancy of public parking lots within the study area. While evaluation of the "worst-case" scenario is not required by law, out of an abundance of caution, the Project has opted to consider this scenario. The assumption that a mass evacuation would occur when the Project is in operation and all residents in the surrounding community are at home when the evacuation order is provided represents an extreme, worst-case condition. In an actual wildfire event, it is most likely that phased evacuation orders would be given to provide for a more orderly evacuation. It is also likely that fewer residents would be present nearby if the evacuation happened during a time that the Project not at full occupancy such as a weekday afternoon.

The wildfire evacuation scenarios selected for this analysis were based on a comprehensive approach that included review of fire history, review of Butler #2 fire in 2007[2], the Fawnskin Fire in 2013[3], and the Radford Fire in 2022[4], review of relevant documents from the County and Cities within the study area[5], fire behavior science, area topography, fuel types and the evolved approach to evacuations which have become increasingly more surgical instead of large, area-wide. Accordingly, given the highest probability wildfire scenarios that would result in evacuation, it is anticipated that specific neighborhoods and communities would be evacuated in a phased approach, as possible. The Project will provide wildfire safety strategies and hardening, which will offer significant structural protection against exposure to wildfire. However, during a wildfire, the Project site's population would likely be evacuated as a precautionary measure. This may be combined with targeted evacuations within existing communities along State Route 38/North Shore Drive. This type of evacuation is consistent with management of recent wildfires throughout southern California and San Bernardino County, where the phased evacuation practice has been implemented with great success and continues to be refined through real-time application.

Project Description

The proposed 62.43-acre Moon Camp project site is located on the north shore of Big Bear Lake, in the unincorporated community of Fawnskin, County of San Bernardino. The Project proposes to construct 50 single family dwelling units with two access points to State Route 38 (SR-38)/North Shore drive. **Figure 1** displays the proposed Project location and study area, and **Figure 2** displays the proposed Project site plan. **Figure 3** displays the Fire Evacuation Routes and Evacuation Zones.

Assumptions

This evacuation analysis was performed for the Project to determine how long it would take for residents of the Project and the residents/visitors surrounding communities to evacuate to nearby more defensible spaces in case of a fire emergency. Current evacuation practice typically targets the scope of the evacuation only to the area in immediate danger and placing a larger area on standby for evacuation. This practice allows for better evacuation operations, reduces gridlock, and reserves sufficient travel way for emergency vehicles. It is assumed that first responders or law enforcement will direct traffic at all major downstream intersections during the evacuation process. Caltrans, the San Bernardino County Fire Department, and the Big Bear Fire Authority, in conjunction with the City of Big Bear Lake and the Big Bear City Community Service District, have various strategies in place for a sustainable[6] evacuation plan. It is presumed that if a fire breaks out close to the Project site, a large-scale evacuation of both the Project area and adjacent lands would be necessary.

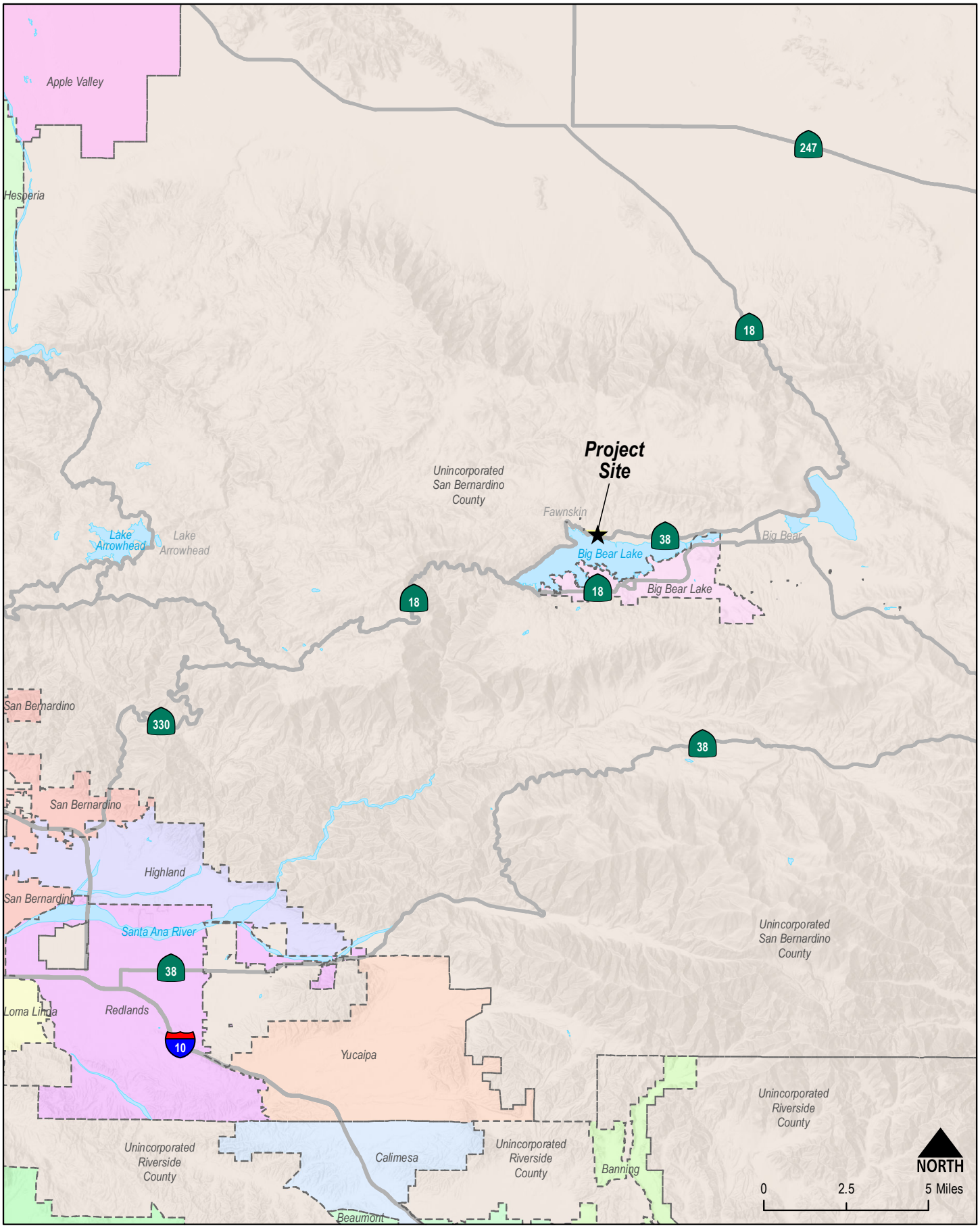
[2] https://calfire.blogspot.com/2007/09/butler-2-fire-perimeter-map.html
[3] https://www.fs.usda.gov/detail/sbnf/news-events/?cid=STELPRDB5417310
[4] https://inciweb.nwcg.gov/incident-information/cabdf-radford
[5] List of applicable reports are provided at the end of this memorandum.
[6] Caltrans indicates that the roadway network can provide a sustainable evacuation and emphasize the important of early evacuation to avoid a large-scale evacuation scenario.
https://www.vvdailypress.com/story/news/politics/county/2019/05/08/big-bear-s-fire-escape/5219035007/

During the evacuation process, wildfire spread, and encroachment may be slowed by fire-fighting efforts that would likely include significant fixed wing and helicopter fire-fighting assets. Hand crews would also be deployed toward containment. None of the evacuation scenarios assumed contraflow (reverse) lanes, as these lanes are reserved for first responders, law enforcement, and fire fighters in case of unforeseen circumstances.

Given the project's location, surrounded by residential areas and recreational land uses, this analysis takes into account a hypothetical evacuation scenario on a Saturday afternoon. At this time, it is anticipated that the majority of residents will be home, neighboring vacation properties will be at full capacity, and nearby public and private parking lots—including those linked to nearby marinas, the Big Bear Discovery Center, and other hiking trails—will also be fully occupied. The estimation of vehicles evacuating from the Project's site was derived by multiplying the number of households by the average vehicle ownership per household in the vicinity. Similarly, for the surrounding residential areas, the number of evacuating vehicles was determined using land use information from Parcel Quest parcel map data in conjunction with the average vehicle ownership data provided by the US Census Bureau. For both public and private recreational areas, the assumption was made that parking lots would be at full capacity. The inventory of these parking spaces was sourced from Nearmap aerial imagery.

For a reasonable analysis, these scenarios assumed that two percent (2%)[7] of the evacuating vehicles are heavy vehicles (trucks with trailers). Two percent is the nationally acceptable ratio of heavy vehicles to all vehicles.

[7] https://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_599.pdf (p.5).



Moon Camp
Evacuation Analysis

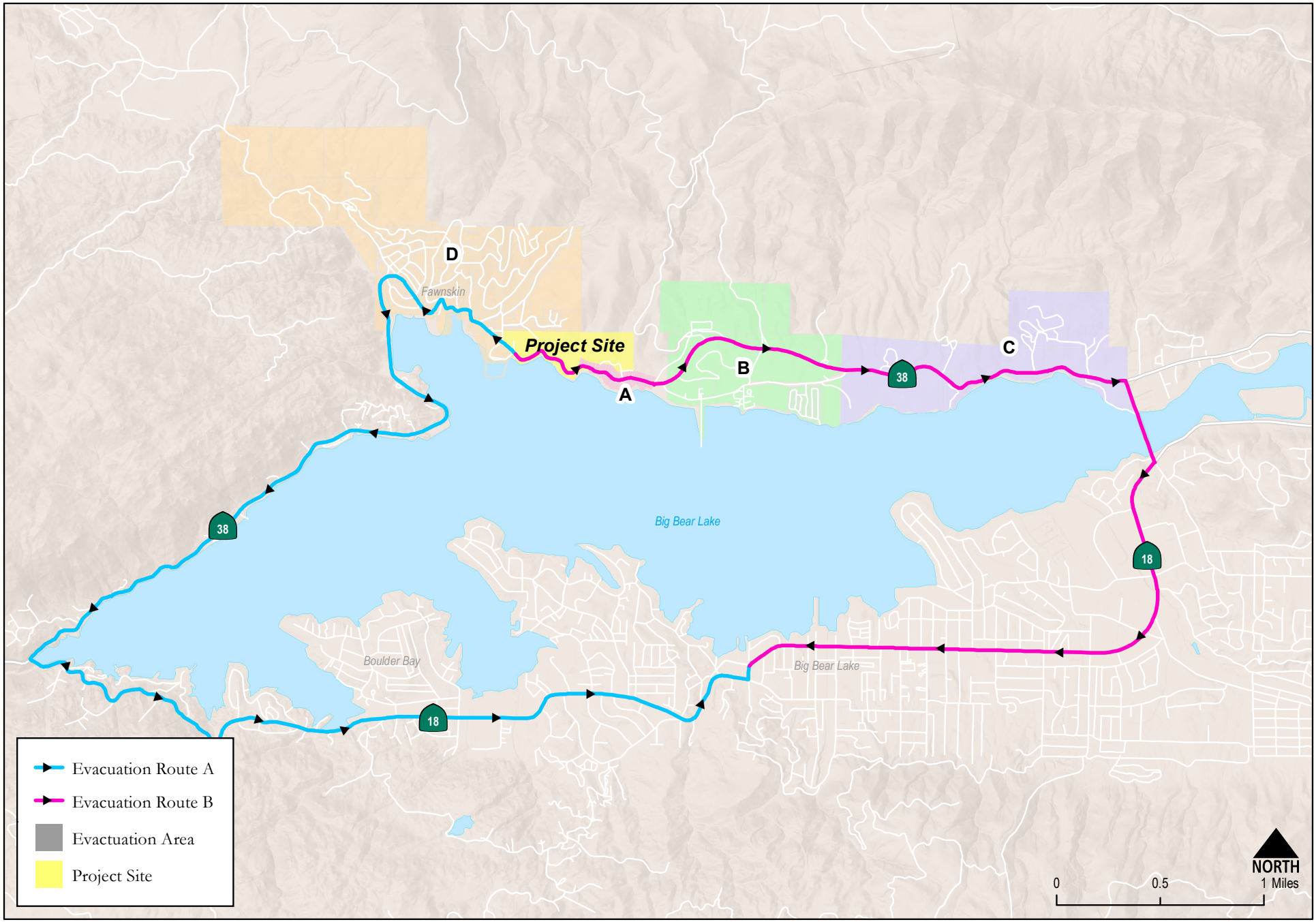
C+R

Figure 1
Project Location

Moon Camp
Evacuation Analysis

C+R

Figure 2
Project Site Plan



Moon Camp
Evacuation Analysis

C+R

Figure 3
Evacuation Routes and Evacuation Zones

Saturday Afternoon Evacuation; all residents are home

CRA presumes that the evacuation would transpire on a Saturday afternoon, a time when residents from the Project and nearby communities are home, meaning all residential vehicles would be required to evacuate. Additionally, it is assumed that the parking demand for nearby recreational land uses would be fully occupied, thus the vehicles associated with the recreational land uses would evacuate at the same time as the Project and other residential land uses.

In an actual evacuation scenario, the total number of vehicles needing to evacuate may actually be less. The Operation Area commander would prioritize evacuation of land uses located closest to the area with immediate risk, depending on the location of the fire.

Primary Evacuation Routes

CRA assumed that traffic evacuating from both the Project and nearby communities/land uses would use the closest evacuation routes to leave the area. Evacuation routes were selected based upon review of the Project's site, available evacuation routes, and the quickest way to leave areas located adjacent to the available vegetative fuels. Evacuations during large wildfire events would focus on removing threatened populations from the area, likely off the mountain. For this analysis, we assume a condition where the populations are directed to the developed areas of the City of Big Bear Lake, selecting the path requiring the least travel time. This location provides a significant buffer to the north/northeast with Big Bear Lake acting as a large fuel break. Based on Google's traffic data for a typical Saturday afternoon, the fastest evacuation route for traffic from the Project and areas A through C would be to head east on SR-38/North Shore Drive and then proceed towards the City of Big Bear Lake via Stanfield Cutoff and Big Bear Boulevard (pink evacuation route). Conversely, the quickest route for Area D would be to head southwest via North Shore Drive and Big Bear Boulevard (blue evacuation route). The Google travel time assessment is provided in **Attachment A**. This assumption selects a reasonable evacuation route for the assumed extreme weather scenario.

No contraflow lanes were assumed to provide access for first responders and law enforcement.[8] Two-way travel was assumed, with evacuating vehicles traveling outbound to the designated Safe Zone. It is assumed that first responders or law enforcement will direct traffic at all major intersections during the evacuation process. Should evacuation managers determine that contraflow is preferred or necessary, evacuation capacity would increase while evacuation times would decrease.

Safe Zone

Based on Dudek's review of the area's fire history[9], fires have not reached the City of Big Bear and the land uses along Big Bear Lake. In past fire events, the incident commander and the Red Cross have traditionally used local educational facilities as evacuation centers[10]. However, studies indicate that people generally resort to these evacuation centers only as a last option, mainly due to the absence of privacy and convenience[11]. Therefore, it is assumed that evacuees will likely head toward the more urbanized center of the City of Big Bear Lake, where multiple lodging options are available.

[8] Contraflow or lane reversal involves directing traffic to use lanes coming from the source of a hazard to move people away from the hazard. Such a strategy can be used to eliminate bottlenecks in communities with road geometries that prevent efficient evacuations or to facilitate traffic flow out of a major urban area. Among the considerations in planning emergency contraflow are whether sufficient traffic control officers are available, potential negative impact on responding fire apparatus, access management, merging, exiting, safety concerns, and labor requirements. Contraflow configurations must be carefully planned based on on-site factors and should not be implemented in an *ad-hoc* fashion. Dudek July 2014. "Wildland Fire Evacuation Procedures Analysis" for City of Santa Barbara, California, page 65.
[9] GIS review of CALFIRE California Fire Perimeters
https://hub-calfire-forestry.hub.arcgis.com/maps/e3802d2abf8741a187e73a9db49d68fe/about
[10] http://www.bigbearfire.org/homepage/press-releases/252-radford-fire-update
[11] https://tsrc.berkeley.edu/publications/review-california-wildfire-evacuations-2017-2019

Study Scenarios
A total of five evacuation scenarios were analyzed:

- **Scenario 1** – *Existing Land Uses*: This scenario estimates the evacuation time for the existing land uses within the study area (Area A through D).
- **Scenario 2** – *Proposed Project Only*: This scenario assumed full evacuation of the proposed Project.
- **Scenario 3** – *Existing Land Uses with the proposed Project*: This scenario is similar to Scenario 1 (Area A through D), with the addition of the proposed Project traffic.
- **Scenario 4** – *Existing Land Uses with Cumulative Projects*[12]: This scenario is similar to Scenario 1, with an ambient growth of 5% to represent potential cumulative growth in the area, the Marina Point project (120 dwelling units)[13] and TT 17670 (22 dwelling units).
- **Scenario 5** – *Existing Land Uses with Cumulative Projects with the proposed Project*: This scenario is similar to Scenario 4, with the addition of the proposed Project traffic.
- **Scenario 6** - Existing Land Uses with Cumulative Projects (Area D only): This scenario is similar to Scenario 4, but assuming that only Area D is under an evacuation order. Under this scenario, all of Area D would evacuate eastward via North Shore Drive, then southward via Stanfield Cutoff to arrive at the City of Big Bear (pink evacuation route).
- **Scenario 7** – Existing Land Uses with Cumulative Projects with Project (Area D only) – This scenario is similar to Scenario 6, with the addition of the proposed Project traffic.

Evacuating Vehicles

The number of evacuating vehicles was calculated using the following assumptions:

- Project and nearby Residential land uses: Residential units x average vehicle ownership (2 vehicles per household)
- Recreational land uses: full occupancy of parking lots
- RV resorts: full occupancy of parking lots and site.

Noted that the total number of evacuating vehicles assumed a very conservative estimate where all nearby residential land use are fully occupied, in actual evacuation, depending on the time of day or day of the year, actual occupancy maybe significantly less. For instance, only about 19%[14] of the mailing addresses in Area D correspond to residential units within that area. The other 81% are linked to addresses outside of Area D. Additionally, the nearby recreational areas are unlikely to be at maximum capacity.[15]This suggests that these properties (81%) might be secondary residences that aren't necessarily occupied when an evacuation order is issued.

Average vehicle ownership, residential units, and evacuating vehicles calculations are provided in Attachment A. **Table 1** displays the number of vehicles evacuating under each scenario.

Table 1 – Evacuating Vehicles

[13] Source: Moon Camp Focused Traffic Impact Assessment, Urban Crossroad, 2018.

[14] Mailing zipcode obtained from Parcelquest, a summary is included in Attachment A. Additionally, the County of San Bernardino Short Term Rental permitting system (https://str.sbcounty.gov/permitted-str-properties/) indicated that approximately 12% of the residential units in Area D are permitted short term rental.

[15] Satellite imagery from July 8, 2022, a time typically marked by high demand for recreational activities due to the area's hiking trails, shows only 10% of parking spaces being occupied.

Scenario	Number of Evacuating Vehicles					
	Nearby Land Uses (Area)				Project	Total
	A	B	C	D		
Scenario 1 – Existing Land Uses	112	380	394	1,425	0	2,311
Scenario 2 – Proposed Project Only	0	0	0	0	100	100
Scenario 3 – Existing Land Uses with Proposed Project	112	380	394	1,425	100	2,411
Scenario 4 – Existing Land Uses with Cumulative Projects	120	400	420	1,790	0	2,730
Scenario 5 – Existing Land Uses with Cumulative Projects with the proposed Project	120	400	420	1,790	100	2,830
Scenario 6 - Existing Land Uses with Cumulative Projects (Area D only)	0	0	0	1,790	0	1,790
Scenario 7 - Existing Land Uses with Cumulative Projects with Project (Area D only)	0	0	0	1,790	200	1,990

Source: CR Associates (2023), US Census Bureau (2023), Google Maps (2023).

Mass Evacuation

A mass evacuation scenario was modeled in which all area residents would evacuate at the same time. This assumption presents a worst-case scenario as all traffic would be directed to the evacuation roadways at once. Mass evacuation events can overwhelm a roadway's capacity, which, when reaching a threshold traffic density, begins to decrease traffic flow.

In an actual "real-life" wildfire event, a phased evacuation would be implemented where orders are given to evacuate based on vulnerability, location, and/or other factors, which reduces or prevents traffic surges on major roadways and improves traffic flow. The phased evacuation strategy also prioritizes the evacuation of residents in proximity to the immediate danger, giving emergency managers the ability to monitor the fire situation and decide in real time based on changing conditions whether to order additional evacuations as needed, or not.

Extreme Wildfire Event

The evacuation analysis set forth below assumes a Santa Ana-wind driven fire from the north and/or east of the study area and travels in a westerly and southerly direction, similar to the 2017 Thomas Fire. This fire condition is the one most likely to require a large-scale evacuation, and the one that creates the most risk to property and humans. Historically, local fire such as the 2003 Old Fire[16], 2007 Butler Fire 2[17], and the 2023 Radford Fire[18] only resulted in limited evacuation of the affected area.

In California, wildfire-related large-scale evacuations are almost exclusively associated with wildfires that occur on extreme fire weather days, also known as "Red Flag Warning" days. These days occur when relative humidity drops to low levels and strong winds from the north/northeast are sustained. With climate change, periods in which such wildfires occur may increase. During Red Flag Warning days, vegetation is more likely to ignite and fire spread is more difficult to control. In the greater Los Angeles region, these extreme weather days typically occur during limited periods in the late summer,

[16] http://www.firescope.org/training/aars/2003/2003-old-fire-lessons-learned-report.pdf
[17] https://www.fire.ca.gov/incidents/2007/9/14/butler-ii-fire/
[18] https://www.fire.ca.gov/incidents/2022/9/5/radford-fire

fall and, occasionally, in the spring, but may occur at other times on a less frequent basis. Currently, it is not common to experience more than 10 to 15 Red Flag Warning days in a typical year. Wildfires that occur during these periods of extreme weather are driven by winds –referred to as "Santa Ana" winds – that come from the north or east and blow toward the south or west. Fires driven by these winds move very quickly, making them difficult to control. In response to such fires, emergency managers typically activate pre-planned evacuation triggers that require down-wind communities to sequentially be notified to evacuate and move to nearby urbanized areas prior to the fire's encroachment.

Wildfires that occur on non-extreme weather days typically behave in a much less aggressive manner and pose fewer dangers to life and property because they include less aggressive fire behavior and are easier to control. Terrain and fuel are typically the wildfire drivers during these conditions. During these non-extreme weather days, vegetation is much more difficult to ignite and does not spread fire as rapidly. In these situations, firefighters have a very high success rate of controlling fires and keeping them under 10 acres. CALFIRE estimates that 90% of all vegetation fires occur during normal, onshore weather conditions and that such fires account for only 10% of the land area burned. Conversely, the 10% of wildfires that occur during extreme fire weather account for 90% of the land area burned. This data highlights that the most dangerous fire conditions are those related to a fire that moves rapidly due to high winds and low humidity, whereas under normal conditions fires are likely to be controlled with no evacuation or possibly limited extent, focused evacuations.

While it is possible that a fire driven by onshore wind (i.e., from the west) could require evacuation of the Project, such an event would be unusual. Moreover, due to the roadway network and the geography of the Big Bear area, agencies has emphasize the needs for early and phase evacuation to prevent gridlock in an emergency.

Analysis Methodology

The analysis methodology utilized the following equation for determining evacuation time:

Evacuation Time = (Evacuation Population / Average Vehicle Occupancy) / Roadway Capacity

To analyze the evacuation events, CRA conducted simulations using *Vissim*, a microscopic, multimodal traffic flow modeling software used to simulate different traffic conditions. In *Vissim* simulations, roadway capacity is accounted for and each vehicle in the traffic system is individually tracked through the model and comprehensive measures of effectiveness, such as average vehicle speed and queueing, are collected on every vehicle during each 0.1-second of the simulation. This software enables drivers' behaviors during an evacuation to be replicated. A total of 20 simulations were conducted to yield a reasonable sample size to determine the performance of the study area roadways and impacts during evacuation scenarios. To be conservative, CRA assumed a worst-case scenario in which all vehicles belonging to households in the study area would be used in the evacuation, instead of the necessary number of vehicles needed to evacuate the impacted population. Detailed evacuation analysis information is provided in Attachment B.

Evacuation Analysis & Results

Based on the analysis methodology described above, **Table 2** reflects evacuation times for each scenario.

Table 2 – Evacuation Time Summary – All Scenarios

Scenario	Total Evacuation Vehicles	Evacuation Time (hours : minutes)				
		Nearby Land Uses				Project
		A	B	C	D	
Scenario 1 – Existing Land Uses	2,311	0:48	0:38	0:37	1:23	N/A
Scenario 2 – Proposed Project Only	100	N/A	N/A	N/A	N/A	0:25
Scenario 3 – Existing Land Uses with Proposed Project	2,411	0:53	0:40	0:37	1:23	0:52
Change in Evacuation Time - Existing Condition (Scenario 3 – Scenario 1)	-	0:05	0:02	0:00	0:00	0:52
Scenario 4 – Existing Land Uses with Cumulative Projects	2,730	0:50	0:41	0:38	1:39	N/A
Scenario 5 – Existing Land Uses with Cumulative Projects with the proposed Project	2,830	0:56	0:43	0:38	1:39	0:54
Change in Evacuation Time – Existing with Cumulative Projects (Scenario 5 – Scenario 3)	-	0:06	0:02	0:00	0:00	0:54
Scenario 6 - Existing Land Uses with Cumulative Projects (Area D only)	1,790	N/A	N/A	N/A	1:40	N/A
Scenario 7 - Existing Land Uses with Cumulative Projects with Project (Area D only)	1,990	N/A	N/A	N/A	1:42	0:26
Change in Evacuation Time – Existing with Cumulative Projects Area D only (Scenario 5 – Scenario 3)	-	N/A	N/A	N/A	0:02	0:26

Source: CR Associates (2023).

A summary of the evacuation time for each scenario is provided below:

- Scenario 1: It would take between 37 minutes and 1 hour and 23 minutes to evacuate the existing land uses.
- Scenario 2: It would take 25 minutes to evacuate the proposed Project only.
- Scenario 3: It would take between 37 minutes and 1 hour and 20 minutes to evacuate the existing land uses and the proposed Project. The Project increase Area A evacuation time by 5 minutes, Area B by 2 minutes, and it would take 52 minutes to evacuate the Project's site.
- Scenario 4: It would take between 38 minutes and 1 hour and 39 minutes to evacuate the nearby land uses under the cumulative scenario.
- Scenario 5: It would take between 39 minutes and 1 hours and 39 minutes to evacuate the nearby and Project land use under the cumulative with Project scenario. The Project would increase Area A evacuation time by 6 minutes, Area B by 2 minutes, and it would take 54 minutes to evacuate the Project's site.
- Scenario 6: It would take 1 hour and 40 minutes to evacuate Area D, assuming that all of Area D evacuate eastward via North Shore Drive, then southward via Stanfield Cutoff to arrive at the City of Big Bear.

- Scenario 7: It would take 1 hour and 42 minutes to Evacuate Area D, an increase of 2 minutes, and 26 minutes to evacuate the Project.

Currently there are no set standard for acceptable evacuation time due to the myriad of factors influencing evacuations, such as time of day, specific locations, areas at risk, wind conditions, and more. The "Best Practices for Analyzing and Mitigating Wildfire Impacts of Development Projects Under the California Environmental Quality Act"[19] guidance from the California Office of the Attorney General suggests that jurisdictions set benchmarks of significance based on past successful evacuations or on those from communities in similar situations. For instance, the Poinsettia Fire saw a successful evacuation with no fatalities[20], although specific data on the total evacuation duration wasn't included in the official report.

A recent study titled "Review of California Wildfire Evacuation from 2017 to 2019" provides more insights on the topic. This research involved interviews with 553 individuals (297 evacuees affected by various fires) including the Creek Fire, Rye Fire, Skirball Fire, and Thomas Fire. The study aimed to understand the decision-making processes of these individuals during the fires, such as whether to evacuate or stay, when to leave, the paths taken, chosen shelters, destinations, and modes of transportation. According to this research, the time it took for evacuations ranged from under 30 minutes to over 10 hours. From this dataset[21], the average evacuation time for the Creek Fire was found to be 3 hours and 40 minutes, involving 115,000 people[22]. For the Thomas Fire, the average time was 4 hours and 25 minutes, impacting 104,607 individuals. It's important to note that since the Thomas Fire resulted in 2 fatalities, the evacuation time for all the scenarios were compare against the data from the Creek Fire.

With the Project, the evacuation times are less than the average evacuation time for the Creek Fire, and the analyzed timeframe is based on a very conservative scenario, with actual evacuation times expected to occur over a shorter time frame. Other modeling assumptions and limitations are discussed below.

Analysis and Conclusion

Neither CEQA, nor the County has adopted numerical time standards for determining whether an evacuation timeframe is appropriate. Public safety, not time, is generally the guiding consideration for evaluating impacts related to emergency evacuation. The County considers a Project's impact on evacuation significant if the Project will significantly impair or physically interfere with implementation of an adopted emergency response or evacuation plan; or if the Project will expose people or structures to a significant risk of loss, injury, or death involving wildland fires.

The County of San Bernardino has historically had an extremely high success rate for safely evacuating large numbers of people and doing so in a managed and strategic way using available technological innovations. Safely undertaking large-scale evacuations may take several hours or more and require moving people long distances to designated areas. Further, evacuations are fluid and timeframes may vary widely depending on numerous factors, including, among other things, the number of vehicles evacuating, the road capacity to accommodate those vehicles, residents' awareness and preparedness, evacuation messaging and direction, and on-site law enforcement control.

Notwithstanding evacuation challenges and variables, the success rate in the County of San Bernardino in safely managing both mass and targeted evacuations is extremely high for safe

[19] https://oag.ca.gov/system/files/attachments/press-docs/2022.10.10%20-%20Wildfire%20Guidance.pdf
[20] https://www.northcoastcurrent.com/oside-latest-news/2015/05/carlsbad-marks-one-year-since-poinsettia-fire/
[21] 2018 Carr Wildfire Evacuation Survey Data | Zenodo
[22] https://abc7.com/sylmar-brush-fire-creek-kagel-canyon/2740550/

evacuations. Technological advancements and improved evacuation strategies learned from prior wildfire evacuation events have resulted in a system that is many times more capable of managing evacuations. With the technology in use today in the County, evacuations are more strategic and surgical than in the past, evacuating smaller areas at highest risk and phasing evacuation traffic so that it flows more evenly and minimizes the surges that may slow an evacuation. Mass evacuation scenarios where large populations are all directed to leave simultaneously, resulting in traffic delays, are thereby avoided, and those populations most at risk populations are able to safely evacuate.

Based on the evacuation simulations above, under scenarios 1 through 5, evacuation traffic generated by the Project would not significantly increase the average evacuation travel time or result in unsafe evacuation timeframes. Although there is a potential increase in evacuation times of up to 6 minutes for existing communities, it is anticipated that the longest evacuation times would be associated with the Project vehicles. In a likely evacuation scenario, existing residents east of the Project site would be located downstream of Project traffic because they are closer to the evacuation routes and destinations and would be able to evacuate prior to Project traffic reaching the same location.

In Scenarios 6 and 7, the Project might contribute an additional 2 minutes to Area D's evacuation time. However, this added duration can be viewed as relatively minor. The actual evacuation time can fluctuate based on several factors: the specific nature of the evacuation, the scope of the area affected, and other human considerations. For instance, if not all housing units are occupied during the evacuation, if residents of the Project aren't at home, or if the evacuation covers a smaller region, the overall evacuation time could be shorter. Google travel time data exemplifies these variations: the commute between the Project site and Big Bear Lake can differ by up to 10 minutes, ranging from 12 to 22 minutes, at 2 PM on a Wednesday. Furthermore, if deemed essential by the incident commander, the introduction of a counter-flow lane in certain zones could significantly cut down evacuation time. The Project would also provide the responding emergency managers (County of San Bernardino Sheriff and Fire Department, California Highway Patrol, and other cooperating agencies and Departments) the alternative option of recommending that all or a portion of the site's population temporarily seek refuge at designated temporary refuge sites which may include open-air areas around Big Bear Lake or other protected buildings in the City of Big Bear Lake . This on-site sheltering option is a contingency plan, but an important option in the scenario when evacuation is considered infeasible or the less safe option. This would provide emergency managers with a safer alternative to risking a late evacuation.

This information will be provided to law enforcement and fire agencies for use in pre-planning scenarios to better inform in the field decisions made pursuant to adopted Emergency Response Plans. Emergency personnel who issue an evacuation order may take into account these time estimates in determining when and where to issue evacuation orders. In a real evacuation scenario, emergency managers may use alternative actions/options to further expedite evacuation. Such actions may include providing additional lead time in issuing evacuation orders, prioritizing area at higher risks, providing alternative signal control at downstream intersections, utilizing additional off-site routes or directing traffic to roadways with additional capacity, implementing contra-flow lanes, issuing "shelter-in-place" orders when determined to be safer than evacuation, or considering the possibility of a delayed evacuation where parts of the population could be directed to remain on-site until the fire burns through the fuels around the evacuation route. These options require "in the field" determinations of when evacuations are needed and how they are phased to maximize efficiency. Overall, safe evacuation of the Project and surrounding community is possible in all modeled scenarios.

Limitations

In coordination with fire professionals at Dudek, CRA has presented a conservative analysis simulating evacuation during an extreme wildfire event. However, as discussed above, wildfires are variable

events. The underlying planning principle for fire preparedness, given the dynamic nature of a fire, is to demonstrate the availability of multiple route alternatives and response strategies to permit emergency professionals to manage their response according to the specific circumstances. The Project area provides ample route and response alternatives that were not considered in this model. Emergency responders will coordinate the safest possible evacuation based on the dynamic circumstances of the actual event, including the appropriate phasing of the evacuation, and utilization of the most appropriate ingress and egress routes for area residents and emergency responders.

The breadth of route alternatives and response strategies available to emergency professionals to manage a potential fire in the County cannot and should not be evaluated using this evacuation analysis alone. A comprehensive view of Project fire safety is gained by understanding this memorandum, the Project's Evacuation Plan (Dudek 2023), along with the standard protocols and "in-the-field" decision making of emergency responders as detailed in the County[23] and nearby cities Emergency Response Plans documents.

This travel time analysis presents a reasonable vehicle travel time estimate based on professional judgment made by CRA, Dudek, and fire operations experts with experience participating in evacuations in Southern California. Changing any number of these assumptions can lengthen or shorten the average vehicle travel time.

For instance, a situation could arise in which professionals *may* choose to utilize additional roadways for evacuation not utilized in the analyses and *may also* choose to guide vehicle trips to more or different route permutations relative to what has been modeled in this analysis. A phased evacuation is also likely to be implemented, which improves the orderly flow of traffic in an evacuation scenario.

The net result of changing the variables selected could yield an average evacuation travel time shorter or longer than the results detailed in the analysis. Many factors can shorten or lengthen the vehicle time from the results shown herein. For example:

1. Changing the evacuation area affected by the evacuation order would affect the results. For Instance, emergency managers could order an early evacuation of land uses located in higher risks area, such as the Southern Oaks community. Thus, by the time an evacuation order is established for the proposed Project, there would be less vehicles on the road.

2. Increasing or decreasing the number of path permutations and percentage of the population utilizing each route that leads out of the immediate area could shorten or lengthen vehicle travel time relative to the results shown herein.

3. Emergency professionals electing to reserve certain travel lanes for emergency vehicle ingress for periods of time could affect the travel time relative to the results shown herein.

4. Assuming evacuees utilize fewer or more vehicles to evacuate from their homes relative to the vehicle utilization rate selected in the analysis would shorten or lengthen vehicle travel time relative to the results shown herein.

5. Changing the mix of vehicle trips allocated to each evacuation route could shorten or lengthen vehicle travel time relative to the results shown herein.

[23] County of Riverside Emergency Operation Plan: http://riversidecountyca.iqm2.com/Citizens/Detail_LegiFile.aspx?Frame=&MeetingID=2048&MediaPosition=3715.315&ID=10490&CssClass= County of Riverside Emergency Management Plan: chrome- https://rivcoready.org/sites/g/files/aldnop181/files/EMD%202022-2025%20Strategic%20Plan.pdf

6. Assuming different road condition adjustment factors could shorten or lengthen the vehicle travel time relative to the results shown herein.

7. Assuming fewer people are at home when the evacuation notice is given would reduce the number of vehicle trips and shorten vehicle travel time relative to the results shown herein. For instance, an evacuation during daytime hours could result in fewer outbound trips than assumed in this analysis

8. Assuming some portion of vehicle trips are made in advance of the evacuation notice would reduce the number of vehicle trips relative to the results shown herein.

9. Assuming emergency professionals elect to implement contraflow on certain roadways to open up additional lanes for emergency evacuation egress could reduce the travel time results shown herein.

This evacuation time analysis is necessarily limited in scope given the numerous variables inherent in a wildfire and evacuation event. However, as discussed above, it is not anticipated that the Project will significantly impact evacuation of the proposed or existing surrounding communities based on evacuation times and other qualitative considerations.

Prepared by

Phuong Nguyen, PE
Senior Transportation Engineer
CR Associates

Michael Huff
Discipline Director – Urban Forestry + Fire Protection
Dudek

References

Big Bear Fire Authority, California – Fire Department Master Plan – Matrix Consulting Group, July 26, 2017

Big Bear Fire Authority/City of Big Bear Lake/Big Bear City Community Services District Local Hazard Mitigation Plan, January 2020

Big Bear Community Wildfire Protection Plan (CWPP) – Addendum II "A System Approach", July 2018

County of San Bernardino Emergency Operations Plan (EOP) – January/February 2018

County of San Bernardino Multi-Jurisdictional Hazard Mitigation Plan – December 2022

County of San Bernardino Fire and Rescue Mutual Aid Operation Plan – 2014

Bear Valley Electric Service 2023-2025 Wildfire Mitigation Plan – May 2023

CalFire/Board of Forestry and Fire Protection - 2022/2023 Strategic Fire Plan for the San Bernardino Unit

Vehicle Ownership Calculation

DATA NOTES	
TABLE ID:	B25044
SURVEY/PROGRAM:	American Community Survey
VINTAGE:	2021
DATASET:	ACSDT5Y2021
PRODUCT:	ACS 5-Year Estimates Detailed Tables
UNIVERSE:	Occupied housing units
FTP URL:	None
API URL:	https://api.census.gov/data/2021/acs/acs5
USER SELECTIONS	
TOPICS	Owner/Renter (Tenure)
GEOS	Census Tract 113; San Bernardino County; California

Census Tract 113, San Bernardino County, California

Label	Estimate
Total:	631
Owner occupied:	490
No vehicle available	10
1 vehicle available	156
2 vehicles available	160
3 vehicles available	140
4 vehicles available	24
5 or more vehicles available	0
Renter occupied:	141
No vehicle available	7
1 vehicle available	69
2 vehicles available	47
3 vehicles available	0
4 vehicles available	0
5 or more vehicles available	18

VEHICLES AVAILABLE		Household
No vehicle available	0	17
1 vehicle available	1	225
2 vehicles available	2	207
3 vehicles available	3	140
4 vehicles available	4	24
5 or more vehicles available	5	18
	1245	631
Average Veh / HH		1.973058637
Rounded up to 2 vehicles per household for a conservative analysis		

Evacuation Vehicles Calculation

Zone	A	B	C	D	Project
Existing					
Single/Multi Family Residential	47	14	1	689	50
Average Vehicle Ownership	2	2	2	2	2
Total Veh (Residential) - Round up Nearest 10	100	30	10	1380	100
Other LU					
Hotel/Camping	12				
RV Resort (Light House Trailer and Resort)		90			
Big Bear Shores RV Resort		128			
Serrano Camp Ground		132			
Meadows Edge Picnic Area (100 parking spaces)			100		
Big Bear Visitor Center			135		
Big Bear Ranger			19		
East Public Launch (10 parking + 40 RV)			130		
Captain John Fawn Harbor (25 parking spaces)				25	
Loyal Order of the Moose (10 parking Spaces)				10	
Commercial near Fawn Lodge (10 parking spaces)				10	
Total Evacuating Passenger Veh	112	380	394	1425	100
Cumulative Projects					
Marina Point (120 Units @ 2 Veh per Unit)				240	
TT 17670 (22 units @ 2 veh per unit)				44	
Total Evacuating Passenger Veh	120	400	420	1790	100

Evacuation Routes Travel Time per Google Map

Existing

Start Zone	Start Gate	Start Time	End Zone	End Gate	End Time	Elapse Seconds	Elapse Time
A	1	243.44	Area A Evac	6	3144.685	2901.245	0:48
B	2	902.605	Area B Evac	7	3226.475	2323.87	0:38
C	3	237.565	Area C Evac	8	2467.44	2229.875	0:37
D	4	226.175	Area D Evac	9	5238.445	5012.27	1:23

Existing + Project

Start Zone	Start Gate	Start Time	End Zone	End Gate	End Time	Elapse Seconds	Elapse Time
A	1	243.44	Area A Evac	6	3465.88	3222.44	0:53
B	2	902.605	Area B Evac	7	3347.485	2444.88	0:40
C	3	237.565	Area C Evac	8	2468.315	2230.75	0:37
D	4	226.175	Area D Evac	9	5238.445	5012.27	1:23
Project	5	323.85	Project Evac	10	3452.505	3128.655	0:52

Project Only

Start Zone	Start Gate	Start Time	End Zone	End Gate	End Time	Elapse Seconds	Elapse Time
Project	5	323.85	Project Evac	10	1849.555	1525.705	0:25

Cumulative

Start Zone	Start Gate	Start Time	End Zone	End Gate	End Time	Elapse Seconds	Elapse Time
A	1	242.755	Area A Evac	6	3272.835	3030.08	0:50
B	2	902.605	Area B Evac	7	3364.665	2462.06	0:41
C	3	237.245	Area C Evac	8	2571.605	2334.36	0:38
D	4	225.69	Area D Evac	9	6218.32	5992.63	1:39

Cumulative + Project

Start Zone	Start Gate	Start Time	End Zone	End Gate	End Time	Elapse Seconds	Elapse Time
A	1	242.755	Area A Evac	6	3616.805	3374.05	0:56
B	2	902.605	Area B Evac	7	3497.825	2595.22	0:43
C	3	237.245	Area C Evac	8	2573.075	2335.83	0:38
D	4	225.69	Area D Evac	9	6218.32	5992.63	1:39
Project	5	323.85	Project Evac	10	3579.115	3255.265	0:54

Appendix D

Big Bear Valley Community Wildfire Evacuation Plan (CWPP)

Big Bear Valley Community Wildfire Protection Plan

Final Plan
"A Systems approach"
June, 2006

Prepared by
David A. Yegge M.P.A., B.B.A., A. S.
Fuels Technician
City of Big Bear Lake Fire Department

Submitted To
City of Big Bear Lake
Big Bear City Community Services District
San Bernardino County

Special Acknowledgement

to the

United States Forest Service,
San Bernardino National Forest,
Mountain Top Ranger District

and the

California Department of Forestry,
San Bernardino Ranger Unit

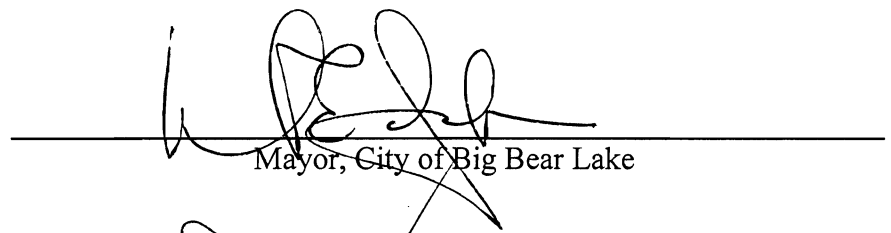
for Providing Supportive Maps, Statistics,
Reports, Information, and Data
Necessary to Accomplish the
Big Bear Valley Community Wildfire Protection Plan

PLAN ACKNOWLEDGEMENT

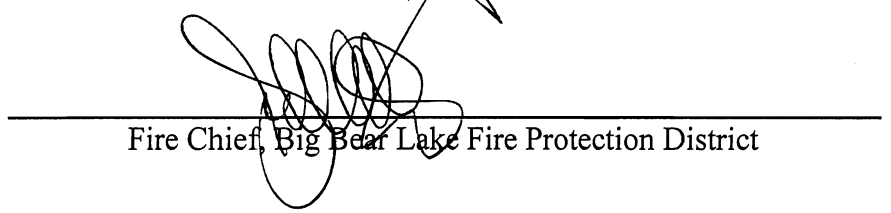
The Community Wildfire Protection Plan:

- Was collaboratively developed. Interested parties and federal land management agencies managing land in the vicinity of the Big Bear Valley have been consulted.
- This plan identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatment that will protect the Big Bear Valley.
- This plan recommends measures to reduce the ignitability of structures throughout the area addressed by the plan.

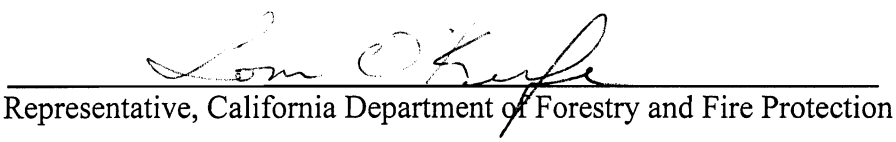
The following entities mutually agree with the contents of this Community Wildfire Protection Plan:



Mayor, City of Big Bear Lake



Fire Chief, Big Bear Lake Fire Protection District



Representative, California Department of Forestry and Fire Protection

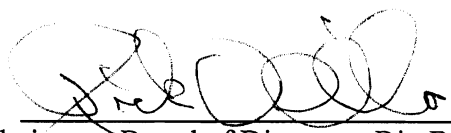
NOTE:
At its meeting of July 10, 2006,
the City of Big Bear Lake City Council authorized the Mayor to acknowledge and sign the
Big Bear Valley Community Wildfire Protection Plan

PLAN ACKNOWLEDGEMENT

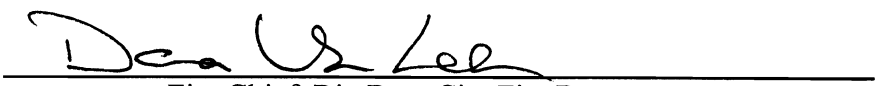
The Community Wildfire Protection Plan:

- Was collaboratively developed. Interested parties and federal land management agencies managing land in the vicinity of the Big Bear Valley have been consulted.
- This plan identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatment that will protect the Big Bear Valley.
- This plan recommends measures to reduce the ignitability of structures throughout the area addressed by the plan.

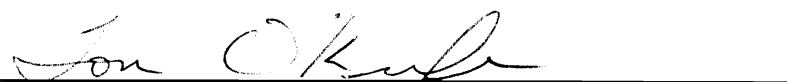
The following entities mutually agree with the contents of this Community Wildfire Protection Plan:



Chairman, Board of Directors, Big Bear City Community Services District



Fire Chief, Big Bear City Fire Department



Representative, California Department of Forestry and Fire Protection

NOTE:
At its meeting of August 7, 2006, the Board of Directors of the Big Bear City Community Services District authorized the President to acknowledge and sign the Big Bear Valley Community Wildfire Protection Plan

PLAN ADOPTION

The Community Wildfire Protection Plan:

- Was collaboratively developed. Interested parties and federal land management agencies managing land in the vicinity of the Big Bear Valley have been consulted.
- This plan identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatment that will protect the Big Bear Valley.
- This plan recommends measures to reduce the ignitability of structures throughout the area addressed by the plan.

The following entities mutually agree with the contents of this Community Wildfire Protection Plan:

Chairman, San Bernardino County Board of Supervisors

Fire Chief, San Bernardino County Fire Department

Representative, California Department of Forestry and Fire Protection

REPORT/RECOMMENDATION TO THE BOARD OF SUPERVISORS OF SAN BERNARDINO COUNTY, CALIFORNIA AND RECORD OF ACTION

February 6, 2007

FROM: **PAT DENNEN**, Fire Chief/Fire Warden
San Bernardino County Consolidated Fire District

SUBJECT: **COMMUNITY WILDFIRE PROTECTION PLAN CREATED BY FIRE SAFE COUNCIL OF BIG BEAR VALLEY**

RECOMMENDATION: Acting as the governing body of the County of San Bernardino and the San Bernardino County Consolidated Fire District, agree with the contents of the Community Wildfire Protection Plan created by the Fire Safe Council of Big Bear Valley.

BACKGROUND INFORMATION: A Community Wildfire Protection Plan (CWPP) enables a community to effectively plan how it will reduce the risk of wildfire. The Inland Empire Fire Safe Alliance (IEFSA) has been an effective coordinating force behind the Local Fire Safe Councils (FSC) and their Chapters that have taken on the task of completing CWPPs in all communities across the mountains. These are the same concerned citizens who were instrumental in successfully preparing our communities for the wildfires of 2003.

CWPPs are authorized and defined in Title 1 of the President's Healthy Forests Restoration Act (HFRA) of 2003. The HFRA emphasizes the need for Federal Agencies to work collaboratively with communities in developing hazardous fuel reduction projects, and places priority on treatment areas that have been identified by the affected communities and included in a CWPP. County recognition of the CWPP contents provides communities an opportunity to influence where and how federal, state, and local agencies implement fuel reduction projects on federal land adjacent to their community, as well as how additional federal funds may be distributed for projects on non-federal lands. Other agencies that are signatory to the CWPPs include the United States Forest Service, the California Department of Forestry, and San Bernardino County Fire.

The CWPPs must at a minimum, address three areas of concern as identified in the Presidents HFRA. These areas are Collaboration, Prioritized Fuels Reduction and Treatment of Structural Ignitability. First, the CWPP must be collaboratively developed with local and state government representatives, in consultation with federal agencies, and other interested parties. Second, the CWPP must identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment that will protect one or more at-risk communities and essential infrastructure. Third, the CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan. County Fire has determined that the CWPP for Big Bear Valley has addressed all of the appropriate elements as provided in the National and State Guidelines.

cc: SBCCFD-Dennen; Brierty
CAO-Thies
CC-Krahelski
File-SBCCFD w/attachment and CD

Record of Action of the Board of Supervisors

APPROVED(CONSENT CALENDAR)
BOARD OF SUPERVISORS
COUNTY OF SAN BERNARDINO

MOTION	AYE	AYE	SECOND	MOVE	AYE
	1	2	3	4	5

DENA M. SMITH, CLERK OF THE BOARD

BY _____

DATED: February 6, 2007

Rev 07/97

ml (02/12/07)

ITEM 012

The efforts of the Big Bear Valley Fire Safe Council not only meet, but also well exceed the requirements of the HFRA for the purposes of their CWPP.

Approval of this recommendation would agree with the contents of the CWPP and support the efforts of the Big Bear Valley Fire Safe Council in their pursuit of grant funds to complete their objectives stated in the plan that would ultimately make their community safer.

REVIEW BY OTHERS: This item has been reviewed by the County Administrative Office (Wayne Thies, Administrative Analyst, 387-5409) on January 24, 2007; County Counsel (L. Thomas Krahelski, Deputy County Counsel, 387-5436) on January 25, 2007; and coordinated with the Third Supervisorial District.

FINANCIAL IMPACT: None. County agreement with the contents of the CWPP does not obligate the County to any future financial liability. Funding for future fuels reduction projects as stated in the CWPP will be provided by the Department of Agriculture and the USFS directly, or through the California Department of Forestry and Fire Protection to either the IEFSA or the local FSC.

SUPERVISORIAL DISTRICT(S): Third

PRESENTER: Peter Brierty, Assistant Chief/Fire Marshal, 386-8405

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Section 1.0 Executive Summary

The Big Bear Valley Community Wildfire Protection Plan (BBVCWPP) discusses both public and private concerns. Successful wildfire protection planning involves a review of all protection measures that contribute to a collective "systems approach" process. Eliminating the risk or threat is not always possible when living in a forest. What is possible is minimizing the threat by reducing structure ignitability, developing defensible space, and conducting fuels treatment that reduce the intensity and severity of a wildland fire.

The driving force in developing the BBVCWPP was the Healthy Forest Initiative, the Old & Grand Prix Fires, other historic fires (Bear, Panorama, and Willow), and the ongoing mortality rate of trees within the San Bernardino National Forest. Three broad categories that are discussed in this Plan are (1) the need for fuel breaks and treatments around and within the communities of the Big Bear Valley and in the forest itself; (2) the degree to which enforcement and voluntary participation contributes to the protection scheme; and (3) the willingness to develop and implement retrospective and prospective strategies to reduce the structural ignitability of properties within the Wildland Urban Interface (WUI).

Section 1.1 Plan Process

This Plan was developed after review and evaluation of the National Fire Plan, California Fire Plan template (August 2004 version), South Big Bear Fuels Reduction Project, San Bernardino County Operational Area Plan, and other available relevant documents.

Although this Plan is a public document for Homeland Security issues, certain maps that specifically provide information that may be sensitive in nature are not included. They include fire regime maps, condition class, fire history, utility maps, and critical infrastructure maps. At this time, the writers of this document have chosen not to identify and discuss items considered to be of a sensitive nature in accordance with Homeland Security guidelines.

Section 1.2 Introduction

The Big Bear Valley is nestled in the San Bernardino National Forest. The Valley is one of the only premiere four season mountain resort communities in Southern California. This Valley supports year round activities for snow skiing, fishing, boating, hiking, hunting, off-roading, mountain biking, and just relaxing & enjoying the forest environment. It is home to small boutique shops, eateries, small entertainment businesses, light manufacturing, and commercial industries that support tourism. In 2004, approximately 6 million people visited the Big Bear Valley.

Unknown to most visitors is the fact that the City of Big Bear Lake and the unincorporated Big Bear City Community Services District are listed in the Federal Registry as communities at high risk to wildland fires. Making fire even more of a threat is the ongoing and continual tree death rate within the WUI. A combination of issues has contributed to the alarming

increase in the death rate of various trees within the San Bernardino National Forest. The purpose of this document is to address these issues and propose measures that can reduce the threat of fire to our communities, simultaneously restoring the health of our forest.

Southern California has had drought-like conditions. This is a recurrent event and similar droughts have occurred in the past 100 years, and yet the tree mortality has never occurred to this extent. In some areas of Lake Arrowhead, nearly 90% of all conifer trees have died. In the San Bernardino National Forest, it is estimated that nearly 13 million trees have died. It has actually been said, "we have loved our forests to death."

Secondly, the watershed from years of drought conditions and depletion of the upper ground water aquifers has reduced the available water used by both vegetation and domestic sources.

During the last century after human occupation, fires in the Big Bear Valley have been small in nature. After the turn of the twentieth century and from the earliest date of Forest Service records, the Big Bear Valley has been absent any large or catastrophic fire.

Development in the Valley has caused the elimination of some existing trees, shrubs, and other plants, but it has done little to curtail the catastrophic fire hazard potential in the Valley. It can even be said that development has added fuel to the fire. In fact, it could be argued recent fire modeling of the Big Bear Valley indicates to a high degree that burnable fuel loading, topography, and cyclical climatic conditions cause Big Bear Valley to be susceptible to a large and/or catastrophic fire.

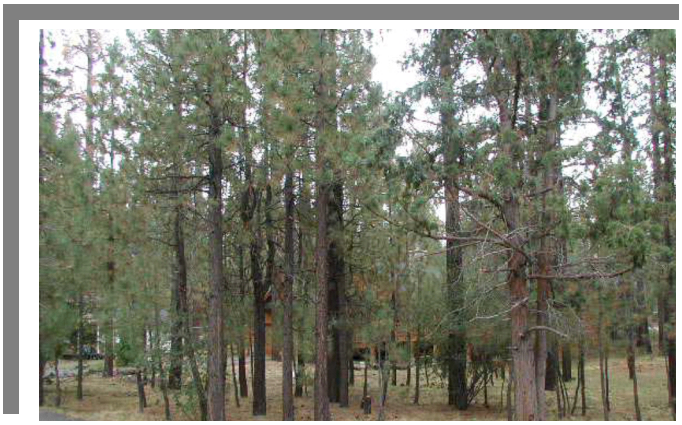
In spite of this very high fire hazard potential rating over the past decades, our fire suppression efforts have been successful at minimizing property damage as well as large vegetation fires in and around the Big Bear Valley. Yet the susceptibility to a large fire has not diminished. For the most part, little can be done to change the topographical and climatic conditions of the Big Bear Valley leaving one of the only changeable features, that being fuel loading.

Prior to Valley development, the Forest Service notes that area fires were more frequent and less intense. This was during an era where fires started by Native Americans and/or lightning caused fires removed the natural accumulation of burnable fuels such as pine needles, twigs, brush, saplings, branches, snags, and down dead trees and were left to burn out naturally leaving a mosaic pattern of fuel density across the landscape of the National Forest.

Over the years, logging of trees helped to reduce the fuel density found in the forest. This practice has been eliminated as a current use of the forest as it transitioned to a tourism and urbanized relief setting, except for the reduction of trees for firewood or small thinning projects. Even the harvesting of Christmas trees by permit is forbidden. This is an indication of the times where environmental sensitivity and preservation of most trees was seen as a normal course of action on both private and public lands but did little to curb fuel loading in our communities and in the forest.

The heightened awareness from a series of catastrophic fires, the rise of beetle infestation, disease, and drought led to experts rethinking past policies and to prescribe treatments to create and sustain forest health as well as provide fuel breaks that would reduce the threat to communities which are at risk.

The hands off approach to harvesting/thinning trees combined with quick suppression efforts and cyclical climatology has combined to exacerbate the declining health of the forest.



This has only increased the probability that a catastrophic fire would occur consuming large areas currently populated by all sizes and types of trees and vegetation. Harvesting/thinning selected trees and brush in forest areas that are densely overpopulated to help reduce the wildfire threat and to create a more bio-diverse ecosystem is necessary. It must be recognized that fuel loading is at its all time high on both private and public lands. The understory of manzanita, ironwood, and scrub oak height range up to 3 to 18 feet with a dense co-mingled canopy that makes it difficult to walk through. Increasingly, the number of dead pine and fir trees is noticeable in the forest in contrast to having one of the wettest years on record.

The tree mortality rate is relatively indiscriminate of age and size. Some of the largest and oldest trees in the San Bernardino National Forest exist within the Big Bear Valley. One of the largest lodge pole pine trees in the United States is located in the forest just south of Big Bear Lake. Large Jeffery pine and white fir series are 250 to 350 years old. Measures to protect and preserve these trees may be necessary, i.e., removing other trees and brush in and around these trees and potentially spraying the trees on an ongoing basis to protect them from beetle infestation.

During the Old Fire in 2003, this conflagration reached a triggering point that forced the evacuation of the communities of the Big Bear Valley for a period of three days. The social and economic effect that resulted has made it difficult for some in the business community to survive. More importantly, there is a feeling of complacency that has set in. People s perception is that the evacuation was unwarranted. Citizens have been heard to say *The next time, I am not going to evacuate.* These attitudes and the high fuel loading combine to set the stage for a potential disaster that could occur the next time a large fire occurs. Public education measures must be taken to inform the community on construction standards, defensible space practices, forest health issues, the need for forest thinning, fuel loading, hazard analysis, protection of old growth trees, the importance of protecting the watershed, and to actively educate the community on the reintroduction of prescriptive and controlled fires into the Big Bear ecosystem on both public and private lands.

It is, therefore, essential to effect a community fire protection plan that addresses the following issues.

Section 1.3 Overall Goals

General Goals

- Ensure the long-term economic stability of the communities by reducing the fire threat risk from very high to moderate/low.
- Identify lands private, public, forested, urbanized or otherwise that, if treated, would reduce the potential fire impact to communities and structures in and around the Big Bear Valley. This is commonly referred to as the Wildland Urban Interface (WUI) zone.
- Implement fuel reduction measures to assure continuing and ongoing safety of the Big Bear Valley watershed and recharge aquifers.
- Identify high valued areas that, if absent from trees, would have a detrimental effect on the appearance and ambiance of the communities of the Big Bear Valley. Propose and implement measures to assure the long-term survivability of these trees.
- Identify and support new markets that collectively, with public and private partnerships, assure that the forest vegetation and trees that are removed go to sources that have a beneficial use, i.e., lumber, biomass chips for landscaping, erosion control, and/or energy.
- Enhance biodiversity and forest health.

Buildings

- Review, evaluate, and modify fire wise building codes and fire protection laws for private landowners/builders to reduce home ignitions.
- Review, evaluate, and make recommendation for a fuel reduction and vegetation management/landscape ordinance.
- Design and develop a list of building standards that existing homeowners can voluntarily install to reduce the vulnerability of their homes.

Public Education

- Provide education to property owners about the need for fire wise construction standards, laws, and codes.
- Through public education and enforcement efforts, maintain ongoing practices of assuring the removal of overgrown vegetation and fuel loading on private lands. Emphasize defensible space clearing on private lands within the Big Bear Valley.
- Monitor, report, and educate citizenry on changes in the biodiversity evidenced within the Big Bear Valley Wildland Urban Interface (WUI).
- Seek as needed assistance from the Natural Resource Conservation Service on monitoring and implementing ways to educate citizenry on methods and techniques to help reduce soil erosion.
- Educate the public on public land fuel treatments, which will reduce local fire risk and improve forest health conditions.

Healthy Forest goals

- Develop and prioritize fuel treatment programs on National Forest lands using Forest Service practices within the Big Bear Valley WUI. For fuel treatment prescriptions on private lands, individuals are required to follow Title 14, State Forest Practice Act.
- Implement treatments within the Big Bear Valley WUI to revitalize forest health. Treatments should promote a mixed age class stand with healthy stocking levels that supports multiple forest resource values such as forest products, esthetics, water, wildlife, recreation, etc.
- Support the reintroduction of prescriptive and controlled fires into the ecosystem of the Big Bear Valley WUI on both public and private lands.
- Incorporate as much as possible a "do more with less" concept by privatizing "off budget" management and treatment prescriptions of the forest.

Section 1.4 Priorities Projects Summary

See Matrix 6.6, Page 43 for CWPP Project Summary.

Section 1.5 Acknowledgements

The Big Bear Valley Community Wildfire Protection Plan recognizes the indefatigable efforts of several individuals of the Big Bear Valley that without their participation and persistent encouragement this Plan would not have been completed.

David Jones, Big Bear Valley Fire Safe Council
Denise Proffer, Big Bear Valley Fire Safe Council
Greg Boll, Big Bear Valley Fire Safe Council
Doug Walton, Big Bear Valley Fire Safe Council
Kathy Sawyer, Big Bear Valley Fire Safe Council
Laura Dyberg, Mountain Rim Fire Safe Council
Local Fire Agencies:
John D. Morley, Fire Chief, City of Big Bear Lake Fire Department
Dana Van Leuven, Fire Chief, Big Bear City Fire Department
Jeff Willis, Assistant Fire Chief, Big Bear City Fire Department
George Corley, Division Chief, San Bernardino County Fire Department
Randy Clauson, Division Chief, United States Forest Service
Beth Nabors, Battalion Chief, United States Forest Service
David A. Yegge Forestry Fuel Technician, City of Big Bear Lake

Section 2.0 Mission Statement

The Big Bear Valley Community Wildfire Protection Plan provides a system-wide approach that reduces the fire hazard potential, enhances bio-diversity, promotes economic stability, is

SAFETY ORIENTATED, ENVIRONMENTALLY SENSITIVE, AND FOCUSES ON CREATING A BENEFICIAL USE OF THE BIOMASS FOR THE GREATEST GOOD.

Section 2.1 Methodology, Process, and Plan Development

The Big Bear Valley Community Wildfire Protection Plan group consists of private citizens involved through the Big Bear Valley Fire Safe Council and representatives from public fire protection agencies that are interested in developing a plan that enhances the protection of the communities, citizenry, infrastructure, historical, and cultural sites as well as assuring a bio-diverse healthy forest through conducting continual and ongoing fuel treatment projects on public and private lands to allow a more healthy sustainable density for generations to come.

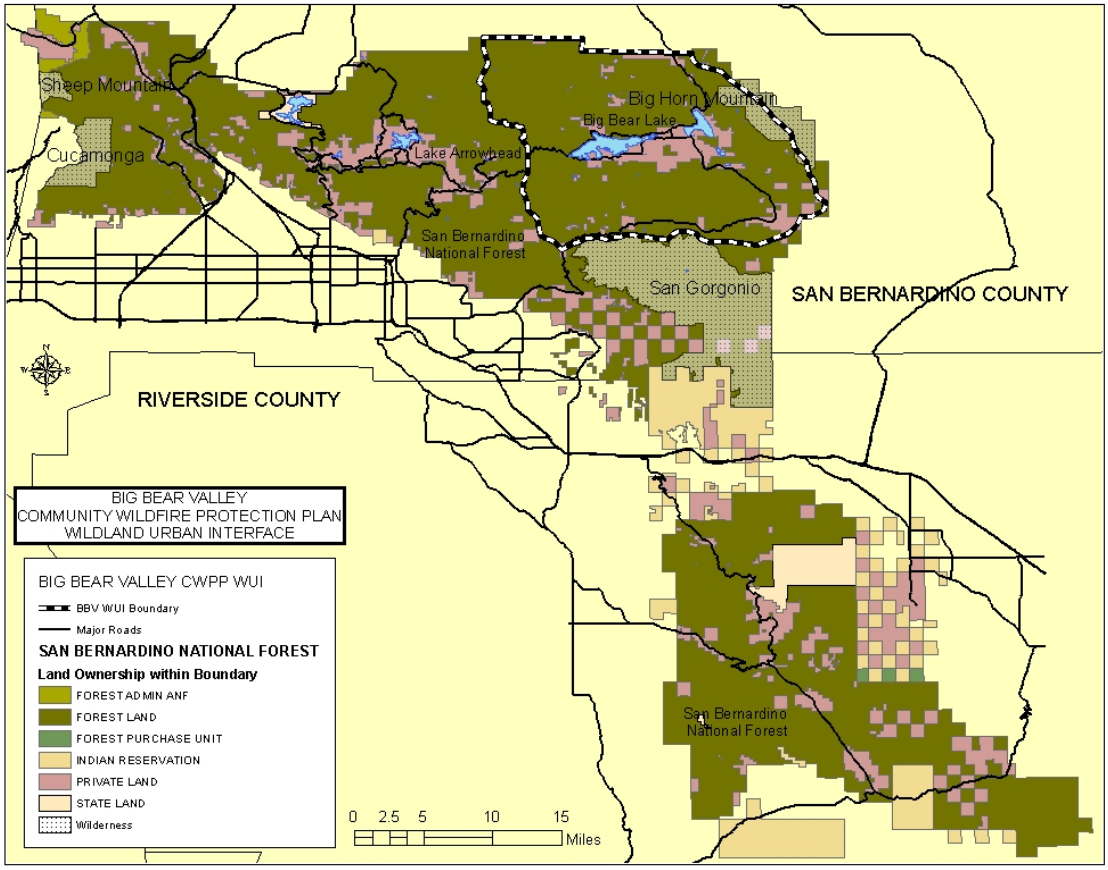
To accomplish this, a local focus group met on an as needed basis for one and a half years to track the Plan's progress. On August 25, 2005, the community was invited to attend a special meeting to discuss and provide input on the boundaries of the Big Bear Valley WUI and to establish community priorities for projects within the WUI.

Section 2.2 Big Bear Valley Wildland Urban Interface and Zone of Influence Boundaries

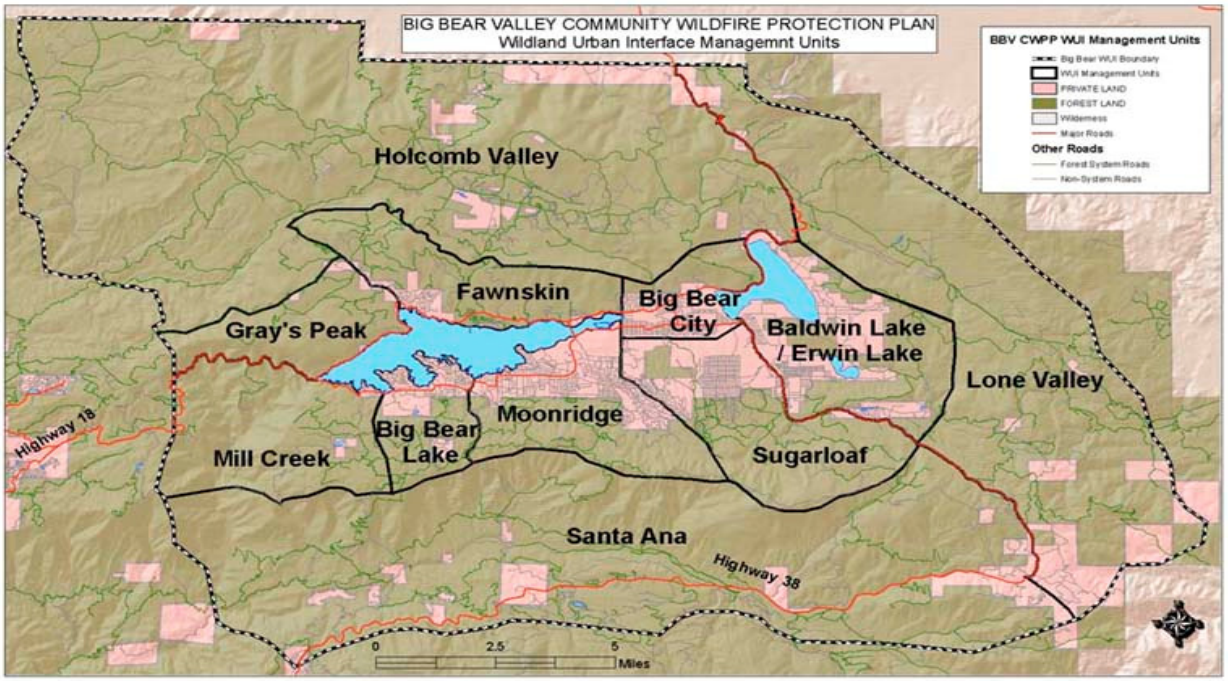
Consistent with the National Fire Plan, the Big Bear Valley WUI boundary is identified in Map 2.2.1. It was determined by evaluating past fire history, natural terrain, most probable threat area, strategic evacuation routes, watershed, drainages, fire regime class, and condition class that if a large fire were to evolve within the zone of influence, significant and detrimental impacts to the Plan's purpose would be affected.

The proposed overall size of the Big Bear Valley WUI is 170,447 acres. Within this area, differences exist on vegetation type, fire regimes, and condition classes that for practicality purposes make it viable for managerial rationale to identify eleven management areas that total the Big Bear Valley WUI boundaries. These management units will be identified by name in the project planning area, acreage, fire regime, condition class as well as the suggested priorities identified in each managerial unit.

MAP 2.2.1 BIG BEAR VALLEY WILDLAND URBAN INTERFACE BOUNDARY



Map 2.2.2 Big Bear Valley Wildland Urban Interface Management unit Boundary



Section 3.0 Community Legal Structures Jurisdictional Boundaries

The Big Bear Valley WUI consists of a mix of political subdivisions within its boundaries. It consists of unincorporated County areas known as Fawnskin and Baldwin Lake. This area encompasses ten square miles of private lands. The principle fire agency providing municipal fire protection is the San Bernardino County Fire Department. As this is an unincorporated area, the primary legal responsibility for vegetation fires and management is the California Department of Forestry and Fire Protection, which is protected by the U.S. Forest Service under an acreage exchange agreement.

In addition, the eastern portion of the Valley has unincorporated lands governed by the Big Bear City Community Services District (CSD). One authority of the Community Services District is to provide municipal fire protection for communities such as Big Bear City, Sugarloaf, Erwin Lake, eastern Moonridge, and Lake Williams. The CSD fire agency is called the Big Bear City Fire Department. The primary legal responsibility for vegetation fires and management is the California Department of Forestry and Fire Protection, which is protected by the U.S. Forest Service under an acreage exchange agreement.
The City of Big Bear Lake is an incorporated city government that includes a subsidiary fire district known as the Big Bear Lake Fire Protection District. As such, the Big Bear Lake Fire

Protection District has primary responsibility for both vegetation and structures within the City's boundaries as well as leased structures that exist outside the City's boundaries on Forest Service land.

The Forest Service provides primary protection for vegetation within the National Forest boundaries. On private properties outside the incorporated boundaries of the City of Big Bear Lake, they provide services within their scope of responsibilities, that of extinguishments of vegetation fires and structure fire exposure protection.

All fire agencies participate in Valley-wide automatic and mutual aid agreements that provide mutual assistance to each other. Seemingly, this mixed type of service appears seamless at the response level. It works quite well and appears to have minimal overlap.

The communities of Big Bear Valley have a high percentage of dwelling units that are vacant or second homes for most people. Table 3.1 indicates that a total square mile area of the communities that contain 95% of structures at risk is 26 square miles. The total assessed value for all communities in the Big Bear Valley is approximately $4 billion. The Forest Service leases land to individuals. There are over 470 special use dwellings on Forest Service leased land within the Big Bear Valley WUI. The assessed value for these structures range between $376 million to $752 million. Additionally, the total number of structured campground/RV spaces within the Big Bear Valley WUI is approximately 700 with an assessed value of $1.5 million. Campgrounds have an average of 40,000 visitors each year.

SECTION 3.1 POPULATION

The current estimated population for the Valley as identified in Table 3.1 is 19,822. This was derived from the 2000 census statistics and current planning & economic documents. This is an increase from the year 2000 of 2,652 or a 15.4% increase in five years or an annual percentage rate of 3.1%. Considering the current population, a projected permanent population for 2015 is 25,768.

According to the U.S. Forest Service, the San Bernardino National Forest is home to approximately 100,000 permanent residents of which 20% are located in the Big Bear Valley. Yet, as with any tourist community, daily visitor populations (DVP) are just as important to include when determining the total population of a community.

The daily visitor population (DVP) as identified in Table 3.1 is equal to 16,384. This equates to approximately 5,943,660 visitors annually. According to the San Bernardino National Forest Business Plan, the estimated DVP in the San Bernardino National Forest is equal to 100,000 people. The Big Bear Valley comprises 16% of the total average daily visitor population that visit the San Bernardino National Forest. Many of these are second homeowners and/or visitors. Certainly, seasonal fluctuations occur. Two ski resorts are located in the Big Bear Valley. For the 2004-05 ski season, a recent published report indicated an estimated three million skiers chose to ski at Big Bear Valley resorts. The

summer season enjoys the next largest influx of visitors with the fall season comprising the third largest season. According to this economic report, the slowest season is after the ski slopes close until June of each year. Generally, there are daily fluctuations that occur as well with the weekends and holidays seeing a higher influx than other days of the week. The Big Bear Valley is located within two to three hours of twenty million people.

The significance of the DVP is an important element to consider when evaluating the significance of the Big Bear Valley. In comparing the DVP in the Big Bear Valley to other well known tourist sites, the Big Bear Valley DVP is equal to the combined total annual visitors to Mount Rushmore National Memorial, Zion National Park, and Bryce National Park. The three parks combined have a population of six million annual visitors. At 16% of the DVP of the San Bernardino National Forest, the Big Bear Valley has the single largest percentage of any community in the San Bernardino National Forest.

Other communities that see a portion of the San Bernardino National Forest DVP are Idyllwild, Blue Jay, Crestline, Crest Forest, Lake Arrowhead, Wrightwood, Lytle Creek, Running Springs, Green Valley, Arrowbear, Forest Falls, Gardner Valley, Angeles Oaks, and other smaller communities. These communities comprise the remaining percentage of the estimated daily visitor population.

The total daily population of the Big Bear Valley including daily visitors and permanent residents as identified by Table 3.1 is approximately 36,106.

TABLE 3.1 BIG BEAR VALLEY WUI VALUES AT RISK

Communities of Big Bear Valley WUI	Population Daily Transient Population/Perma-nent	Square Miles	Housing Units	Commercial Industrial Square Feet	Assessed Value
City of Big Bear Lake & Fire Protection District	10,250 11,250/6028	8 9	9,210 9,210	1.8 M 1.8 M	$2 B $2 B
Big Bear City Community Services District	4,500/12,584	21.13	10,400	849,475	$1,611B
Unincorporated area of BBVWUI protected by County Fire Department	250/1210		1,000	45,000	$411 M
Forest Service Buildings			NA	30,000	$4.5 M
Special Use Housing	260/0		470	376,000	$376 M to $752 M
Campground/RV Spaces	2,800****		700		
Non-assessed Buildings & Equipment **	Reserved for Future	Reserved for Future	Reserved for Future	Reserved for Future	Reserved for Future
Bear Valley Electric					$26 M
BBVWUI Total ***	*16,284/19,822				$4.091 B

* The current estimated daily transient population was derived from the Big Bear Economic Performance Report and the United States Forest Service Environmental Assessment Report. An estimated 5,943,660 people visit the Big Bear Valley annually.

** The non-assessed value buildings include churches, schools, government facilities, and portions of the ski resorts. The projected replacement value of electrical infrastructure exceeds $55 million in fixed facilities and equipment.

*** The estimated total does not include community infrastructure that may or may not be affected by a wildland fire, i.e., roads, water system, electrical transmission lines, telephone cables, boat docks, ski lifts, dams, etc. **In 2003, the estimated value of improvements for the Big Bear Valley was in excess of $9 billion.**

**** The population number was arrived at by using 700 camping/RV spaces times 4 occupants per space. Spaces are open seasonally. Amount is previously included in the DVP for the City.

Section 3.2 Demographics

The U.S. Census indicated that in 2000, the Big Bear Valley ethnicity consists of 81.5% Anglo Saxon, 13.3% Hispanic, and 2.5% African American/Asian/Indian. The age distribution indicated that 73.8% of the residents of the Big Bear Valley were less than 55 years of age. Strikingly, 53% of the households earned less than $44,999.

As anticipated in an area with high tourism, the employment rate of growth is cyclical. Yet, the overall job growth was strong during the period evaluated with the largest job growth occurring in the retail sector. The inflation adjusted increase in payroll from 1990 to 2000 grew an estimated $17 million, which is a 27.5% increase from 1990. Big Bear employers paid employees an average of $17,646 for full or part-time positions. The number of businesses expanded from 1990 to 2000 by 76 companies.

The Big Bear areas' total taxable sales reached a record $144 million in 2000. The year 2000 was the last year evaluated by this report.

Table 3.1 indicated that the projected assessed value within the Big Bear Valley is $4.091 billion. This does not include an estimated value to the water distribution system, wastewater treatment system or underground / aboveground utilities. Nor does it include structures that are not taxed, i.e., schools, churches, certain governmental buildings, and some buildings on federal leased land. The San Bernardino County Multi-Hazard Functional Plan identifies twenty buildings on their roll of critical governmental facilities of potential loss but failed to identify schools, churches, ski resorts or Forest Service buildings.

Section 3.3. Land Use Trends

The primary land use within the Big Bear Valley Wildland Urban Interface is single-family homes. There are approximately 16,872 acres of private land in the Big Bear Valley that is within the San Bernardino National Forest. Since there are a limited number of acres, there are ultimately a limited number of parcels. Most of the level lots or most desirable lots have been developed. The trend is for development on the less desirable, higher angled-sloped properties. These properties tend to be closer to the boundaries of the National Forest or open undeveloped areas.

Section 3.3.1 Density

The density of structures per acre varies greatly within the communities of the Big Bear Valley. Some older lots are several acres in size. In other tracts in Sugarloaf, Erwin Lake, and lower Moonridge, lot widths are twenty-five to thirty feet and lot sizes are approximately 2,500 square feet,

which can accommodate up to 17 dwellings per acre. Historically, these lots were designed for tent camping use, which evolved over time with structures. Other areas within the Valley have 4,500 to 5,000 square foot lots, allowing up to 10 structures per acre. The trend on these lots is to create multi-story dwellings to increase living space.

The City of Big Bear Lake allows a minimum setback of three feet for lots less than thirty feet wide while the CSD and the County requires a minimum of five feet on similar lots. Under the right conditions, a fire can and will transmit from one dwelling to another subjecting these highly dense areas to a potential conflagration. It has not been uncommon for firefighters in the areas of Sugarloaf and lower Moonridge to arrive on the scene and have multiple homes threatened or involved in fire.

A more important responsibility of a fire department is balancing the available water in the water main to the required fire flow of the structures. Lot sizes in the 2,500 square foot range of Sugarloaf, Erwin Lake, and lower Moonridge, consideration should include increasing the calculated fire flow for exposures and density. In accordance with the 2005 Insurance Services Office "Guide for Determining the Needed Fire Flow", dwellings constructed of Type V non-rated construction with a ten foot setback or less require a minimum flow of 1,500 gpm. Moreover, the existence of shake shingle roofs on previously constructed buildings compounds the probability of ignition and significantly contributes to the spread of fire. Thus, the Insurance Services Office adds 500 gpm fire flow to the base fire flow required for a dwelling. This brings the needed fire flow to 2,000 gpm. This is 100% greater than the current standards typically required by most fire agencies within the BBVWUI. Fire officials should collectively review the minimum setback requirements and minimum fire flow standards for communities of the BBVWUI and consider additional flow for proximity to vegetation density, type of construction, existing shake shingle roofs, vehicle access, exposures, etc.

Section 3.4
Utilities

Section 3.4.1 Electrical Power

The existing utility services transverses the canyon and ridges north of Lucerne Valley and the Santa Ana River basin. The electrical service lines feeding the Big Bear Valley cannot support the demand during the peak usage period. Consequently, the need to provide supplemental electricity was and is needed; a natural gas fed generator with 8.4 megawatts of production capacity was installed and is available during peak periods to meet consumer needs. Additional natural gas/diesel powered generating plants are being proposed that would generate smaller megawatts of power.

Table 3.1 identifies Bear Valley Electric (BVE) as one of the major values at risk. The projected replacement value of electrical infrastructure exceeds $55 million in fixed facilities

and equipment. BVE contains over 200 miles of overhead power lines that has an estimated replacement value of $26 million.

The California Public Utilities Commission mandates utilities to conduct tree and vegetation clearance in and around aboveground electrical power lines. Bear Valley Electric spends approximately $150,000 annually for tree trimming. Since 2003, BVE has spent over $700,000 removing dead and dying trees as a result of the bark beetle infestation. The estimated tonnage of biomass generated from tree removal is unknown. The electric company maintains a list of participants that wish to have wood chip material delivered as landscape material and/or dust & erosion control as an alternative to disposal at the local landfill. Although the potential utilization of woody biomass as alternative energy use is certainly possible, especially with an estimated 13 million dead trees in the San Bernardino National Forest, a detailed environmental impact and feasibility study has not been conducted that would give stakeholders, governmental leaders, and the communities of Big Bear Valley necessary information to pursue this issue.

Section 3.4.2 Natural Gas/Propane

Service is provided throughout the Valley. Certain areas do not have natural gas service, and therefore, propane tanks are heavily used in outlying areas, organized campgrounds, and leased Forest Service properties. It should be noted that one of the most important safety features that can be installed on propane tanks is that of non-combustible strap hold-downs. According to local fire officials, this is the one item that is missing from the majority of the propane tanks located in the Big Bear Valley.

Section 3.4.3 Waste Water Treatment District

The Valley has sewer services to most of the dwellings, commercial, and industrial buildings. Sewage is processed at a plant on the east end of the Valley, and the effluent is gravity fed to Lucerne Valley with a parallel line that transverses alongside of Highway 18. Camps, Forest Service leased cabins, and the majority of the northern Baldwin Lake area are not connected to the waste treatment facility.

Section 3.5 Hydrology

The City of Big Bear Lake Department of Water and Power and the Big Bear City Community Services District has conducted several studies concerning the hydrology in Big Bear Valley and has identified distinct water shed subunits. Table 3.5 identifies each subunit and the perennial yield of drawing capacity that can be extracted from the watershed. This is based on historical and actual records maintained by both departments.

Currently, the recharge ability of the watersheds seem resilient in that after five years of drought, the draw down on the water table has mostly risen back to normal levels with above normal precipitation after the 2004/2005 rainfall season. Although water conservation

measures and limited new construction can impose short-term solutions to a long term problem, the narrow residual estimated perennial yield of the defined aquifer versus estimated annual use only magnifies the potential impact that a large fire could create.

Conducting a study to determine the potential that a large fire could have on the watershed may be warranted. Watersheds are vital to the long-term economic stability of the Big Bear Valley as 100% of the water comes from local underground aquifers.

TABLE 3.5 PERENNIAL YIELD BY SUBUNITS

Subunit Name	Acre Feet
Millcreek	330 (arsenic & fluoride)
Village	290
Rathbone	1,100-1,200
Division	500-550 manganese issues
Erwin	600
Grout Creek	283 (unavailable to south shore)
North Shore Fawnskin	44
CSD Erwin	600
CSD West Baldwin Lake	500-1,000
CSD Van Dusen	800-900
CSD East Baldwin Lake	>100
Total	5,147–5,997 acre feet

The Department of Water and Power and the Big Bear City CSD maintain maps, which identify the boundaries of each watershed subunit. The watersheds start at the top of the ridgeline and transverse in and around Big Bear Valley. There is little known about the potential increase or decrease in the perennial yield of each watershed should the Forest Service conduct fuel treatment practices in these watersheds. A far more important issue that needs addressing is determining what effects a fire could have on the perennial yield of the subunit watershed, if one were to occur.

A fire could be detrimental to the Big Bear Valley watershed as a whole, yet dependent on the fire size, location in relationship to specific watershed(s), and/or intensity of the fire, it may have limited watershed impact. Unequivocally, a major fire significantly larger than 100 acres would not only have immediate impact on the watershed but lingering diminished watershed retention.

Augmenting the current watersheds' perennial yield through creating a recharge basin or by some other form may provide the "safety net" necessary if and when a large fire occurs that affects the watershed.

Other possible impacts to the watershed as a result of a small fire may occur that affects only a specific watershed subunit. For instance, a small fire (less than 100 acres) on a seemingly

level terrain tends to have little overall impact compared to a small fire in riparian streambeds where vegetation holds back and slows down the speed of running water and allows more infusion into the aquifer.

The crown jewel of Big Bear Valley is Big Bear Lake. Most generally, streambeds terminate in the lake. A decrease in water quality can also be an issue as a result of a small fire or fuels treatment. Measures should be taken to keep the clarity of the water relatively high.

Section 3.6 Schools

Within the Big Bear Valley, the Bear Valley Unified School District provides education through three elementary schools, one middle school, a high school, and one continuation school. The total number of children attending our schools is approximately 3,000. In addition, there are a number of private schools that add approximately 400 more students.

Section 3.7 Hospital

The Bear Valley Community Healthcare District provides emergency room service and patient care with forty beds.

Section 3.8 Emergency Operation Services

The Valley's emergency services operation system functions quite well. The Big Bear Valley Mountain Mutual Aid Association was developed to coordinate and facilitate resources to minimize the impacts of a disaster or emergencies on people, property, and the environment. It involves citizens, businesses, and governmental agencies. It works under the auspices of the San Bernardino County Office of Emergency Services and operates as a non-profit organization.

The organization has been pressed into service on several occasions due to floods, earthquakes, and fires. The process implements the National Incident Management System (NIMS) organizational structure. Other agencies within the Valley have department operating centers that are also utilized, i.e., Sheriff's Department, fire departments, the City of Big Bear Lake, and the United States Forest Service. Most of these rooms are of insufficient size to meet the demands of an Emergency Operations Center. During the 2003 Old Fire, the Emergency Operations Center was housed in a make shift apparatus bay of a fire station because no dedicated building of sufficient size was available. Funding remains the single biggest roadblock to providing a Valley-wide Emergency Operations Center.

Mountain Area Safety Taskforce (MAST) organizations are active in both the San Bernardino and Riverside Counties. Both the San Bernardino and Riverside County MAST organizations are comprised of governmental agencies, private companies, and volunteer organizations concerned with public safety in the mountain areas of their respective jurisdictions. The two County MAST organizations have joined forces to coordinate their

response to the San Bernardino/San Jacinto Mountain Area vegetation mortality emergency at the regional level. While each County level MAST organization has its own County specific concerns, their joint efforts are rooted in a common intention to reduce the current region-wide risk of a major fire and to minimize impacts on mountain communities should one occur. A five-point action plan has been initiated by the two County MAST organizations as follows:

- Assure public safety - critical elements to this action include developing evacuation plans, clearing potential hazard trees from routes in and out of the mountains, and providing emergency planning and hazard mitigation information to the public.
- Obtain funds - work with local, state, and federal legislators to obtain funds to combat the problem.
- Reduce fuel and create fuel breaks - this means planning and organizing the removal of dead standing trees, the reduction of fuel on the ground, and the creation of defensible space around developed areas and homes.
- Develop commercial use or disposal options for waste wood products.
- Identify and develop plans for ensuring long-term forest sustainability.

MAST common priorities for the Big Bear Valley Wildland Urban Interface:

- Evacuation Routes – 111 miles
- Communication Sites – 55 acres
- Big Bear Valley Wildland Urban Interface – 170,447 acres
- Public use and administration facility protection

Section 3.9 Fire Protection Response/Readiness

Table 3.9 evaluates the number of factors that determine the level of readiness and response to a fire within the Big Bear Valley Wildland Urban Interface. The Big Bear Lake and the Big Bear City Fire Departments jointly provide one on-duty chief officer twenty four/seven.

Table 3.9 Fire Protection Response/Readiness

Department	Equipment Number/Type	Manufactured Year	Minimum Staffing
Big Bear Lake Fire Department	1-Type 1 Medic Engine	2004	4-24-7
	2-Type 1 Engines	1989/1984	Cross staff
	1-Type 3 Brush Engine	2003	1 Paid Call, hard staffed on weekends
	1-Type 2 Water Tender	2003	7 Paid Call Firefighters
	2-Command	2001/2003	
	1-Truck Company	2001	
	1-Lt. Rescue	1994	
	1-Utility Vehicle	1997	
San Bernardino County Fire	1-Type 1 Medic Engine	1991	2-24-7
	1-Type 3 Brush Eng.	1994	Six Months
	1-Type 2 Water Tender	1984	3-24-7 Six Months
	1-Command Vehicle		
	1-Lt. Rescue/1-Snow Cat	2002/1994	
United States Forest Service	3-Type 3 Brush Engines	1993, 2001, 2003	5-8-7 year round
	4-Type 6 Engines	2000, 2001, 2-2004	1-8-7 year round
	2 Command Vehicles Type 1 hand crew Type 2 hand crew	2-2003, 2-2001, 2001 rental	1-8-7 year round 20-8-5 Six Months On standby year round
Big Bear City Fire Department	3-Type 1 Engines	2-1990/2004	2-24-7
	1-Type 3 Brush Engine	1997	Cross Staffing Units
	1-Type 2 Water Tender 1- light Rescue	1978*	Situation up-staffing on winter weekends and holidays 2-24-7 Cross Staffing
	3-Medic Ambulances		6-24-7 (One Paid Call)
	3-Command Vehicles	2002/2004	
	1- Snow Cat		Cross Staffing

***NFPA Standard 1901 recommends the replacement of fire apparatus built prior to 1979.**
**** Additional resources are available through the mutual aid system**
***** Resources identified are located within the BBVWUI.**

Section 3.9.1 Specialized Equipment

Currently, the Type 1 engine for San Bernardino County contains a portable gel inductor unit. Some Type 1 engines, Type 3 engines, and water tenders have drafting capability and portable pumping units for potential streambeds, small lakes, pools, etc. but not all. Foam eductors are built into both the City of Big Bear Lake and Big Bear City CSD's Type 3 engines and water tenders.

Section 3.10 Water Distribution System Readiness

To evaluate the water distribution system, a review of the water grid map system was conducted. This grid map system contains sizes of mains, location of hydrants, and pressure reducing valves similar with other water grid map systems. Table 3.10 indicates the fire flow that is available at 20 pounds per square inch (psi). Hydrants in proximity to the National Forest were analyzed to assure that the projected flows would be capable of providing the minimum required fire flow for residential occupancies as required by Appendix III-A of the California Fire Code and/or local standards. The minimum standard fire flow at 20 psi residual pressure for communities in accordance with Appendix III-A is 1,000 gpm. The City of Big Bear Lake and the Big Bear City CSD amended their portion of the code to add a requirement that dwellings in excess of 3,600 square feet would be required to meet the fire flow of Uniform Fire Code, Appendix Table III-A-A-1., which establishes a minimum standard of 1,500 gpm for residential.

The review evaluated public versus private systems, long dead end systems, pipe diameter, and elevation to determine hydrants that would most likely not be able to provide the required fire flow. Ultimately, this means each agency needs to review their water system capabilities within their communities and determine the appropriate action to be undertaken. Water purveyors must be prepared to adopt a capital improvement schedule to help remedy the deficiency of small pipe sizes, loop dead-end lines, improve hydrant spacing, and increase water storage capacity. Table 3.10 indicates that in some areas of the communities, the percentage of the required fire flow is as low as 17%. Many evaluated locations only provide 40 - 70% of the currently recommended flow of 1,500 gpm. The water grid map number W-02 provides only 40 - 50% of the required fire flow (see Table 3.10) In general, the hydrants that are deficient have smaller mains, some two to four inches in size. These are located in the older areas of the communities of the Big Bear Valley.

In review of historical documents, the 2003 Urban-Wildland Interface Code states, *"that an approved water supply for the use of fire protection services to protect buildings and structures from exterior fire sources or to suppress structures fires . . . shall be provided."* The base residential fire flow suggested by the Insurance Services Office is 1,000 gpm for non-vegetated areas, which is the same as Appendix III-A of the California Fire Code. Finally, San Bernardino County's General Plan establishes a 2,000 gpm minimum fire flow requirement for subdivisions with 4 to 7 dwellings per acre.

Today, homes are increasing in size and density. In many cases, they exceed 3,600 square feet. This warrants an increase in the required fire flow to 1,500 gpm. Planning for dwellings larger than 3,600 square feet and allotting a minimal amount for at least 250 gpm for proximity to vegetation would be warranted. These issues combined more than justifies the need to establish a fire flow requirement of greater than 1,000 gpm for one or two unit dwelling units.

The storage capacity available for fire flow was also reviewed. The fire flow capacity was evaluated based on the need to provide 1,500 gpm for two hours. For the first sixteen hydrants listed, a storage capacity of 3 million gallons was used. Column six of Table 3.10 identifies the percentage of fire flow versus storage capacity of the tank. In the area identified as Lake Williams, the capacity of the tank equals the total volume that should be reserved for fire flow.

Table 3.10 Wildland Interface Fire Flow Information

(1) Water Grid Map Number	(2) Hydrants Evaluated	(3) Flow in gpm at 20 psi	(4) Flow in gpm at 20 psi	(5) Percentage of Required/Recommend Fire Flow Provided	(6) Fire Flow Storage Capacity vs. Available Capacity
M-15	214/490	1,336	1,044	89% / 69%	18% / 3M
M-20	224/490	1,443	1,044	96% / 69%	18% / 3M
B-02	471/475	1,747	2,050	116% / 136%	18% / 3M
B-23	394/713	500	520	33% / 34%	18% / 3M
M-08	547/197	2,358	1,354	157% / 90%	18% / 3M
M-12	578/038	1,378	750	91% / 50%	18% / 3M
B-28	P-25/272	258	1,333	17% / 88%	18% / 3M
M-21	614	1,378	1,078	91% / 71%	18% / 3M
W-02	DWP/No #	750	600	50% / 40%	100% / 160T
E-04	DWP/NO#	750	600	50% / 40%	32% / 500T
E-05	DWP/No#	750	600	50% / 40%	32% / 500T
F-7	44/67	375	717	25%/47%	13%/1,334M
F-2	DWP/No#		1517	100%	13%/1,334M
F-4	46/64	925	809	61%./53%	13%/1,334M
Pg. 28&29	CSD/Erwin/DWP		920	61%	13% / 2,160M
Pg. 6	CSD Whis For	1,076	1,336	71% / 89%	13% / 2,160M
Pg. 7	CSD416 Pioneer	850		56%	1.5% / 6M
Pg. 7	CSD1144 Anita	1,745		116%	1.5% / 6M
Pg. 7	CSD113 Sequoia	2,300		153%	1.5% / 6M

Section 3.11 Insurance Ratings

The latest Insurance Services Office classification that was conducted in the fall of 2001 indicates an overall 4/9 rating. This means that in areas of the City of Big Bear Lake that have hydrants, the classification is 4. In non-hydrant areas, the classification is a 9. The City of Big Bear Lake Department of Water received an overall classification of 1. This is quite good considering that there is some recognition that water main sizes in some areas are inadequate to deliver the required fire flow. The ISO "Improvement Statement" identifies that the single largest reason for receiving an overall 4 classification was the limited number of engine company personnel. Similarly ISO ratings for the San Bernardino County and Big Bear City Fire Departments are 5/4/9.

It must be said that the ISO rating does not factor in fire loss statistics, cost effectiveness of their standards or prevention, and defensible space practices within the communities. Most importantly, the ISO rating does not consider a Wildland Urban Interface scenario in its equation to determine its rating.

Section 3.12 Suggestions to Enhance Emergency Fire Response

Emergency response vehicles are hampered by inadequate fire department vehicle access. It is estimated that 20% of the roads in the County unincorporated area do not meet current minimum County street standards. Equally important is that approximately 75% of the roads are accessible by a Type 1 engine and 85% are accessible by a Type 3.

In the City of Big Bear Lake, 5% of the roads do not meet the minimum road width established by the California Fire Code. Two percent are too steep to drive on in inclement weather and approximately 5% of the roads are long, dead end roads with little to no turnaround space.

Currently, approximately five percent of the roads in the Community Services District are unimproved roads. Twenty-five percent of the roads do not meet currently adopted road width standards. Five percent of the roads are too steep for inclement weather. Ten percent of the roads are long dead end roads with limited turning capabilities.

Driveways, or lack thereof, pose a major challenge for all fire engines throughout the Valley. Many homes do not have driveways. Some driveways exceed the Fire Code minimum distance of 150 feet. Others are not all-weather surface nor constructed sufficiently to withstand the weight of heavier type equipment and thus, could crack or collapse under the right conditions.

Most driveways in excess of 150 feet lack sufficient turnaround capabilities as required by the California Fire Code.

Most generally, fire department access difficulties are a result of lots developed prior to the implementation of current fire safety standards that are currently in place in all Big Bear Valley communities.

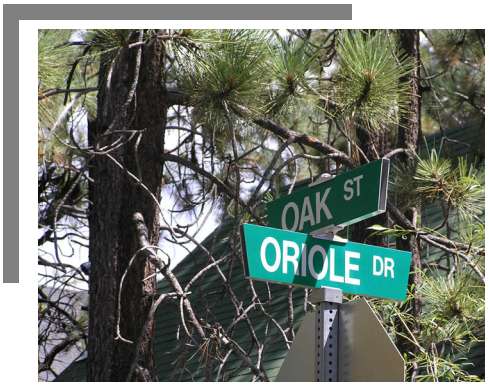
Section 3.12.1 Traffic Congestion

From time to time, traffic can be congested along Big Bear Boulevard. This impacts response times as well as increases the likelihood of an accident involving an emergency response vehicle.

To address current congestion issues along Big Bear Boulevard during peak traffic times, providing all emergency equipment with an Opticom system that activates traffic signal

lights to clear directional traffic would aid in reducing the response times in and around the Big Bear Valley.

Section 3.13 Addressing and Street Signs



Posting addresses on dwellings and assuring all street signs are present is an important key advantage to the expeditious response of fire departments.

Usually, local fire departments have map books and are familiar with the community enough that the lack of addresses and street signs are usually not a significant problem. However, it is incumbent upon us to realize that out-of-town strike teams, out-of-town Sheriff deputies, and disaster teams do not always have the luxury that the local departments have, and therefore, in many large campaign fires, lack of addressing and street signs hinder their response. The communities of Big Bear Valley should annually inspect these items.

Section 3.14 Specialized Equipment Needs

An array of specialized equipment is available for purchase. For structure protection, they include fire protection blankets and compression air foam units or gel type systems. All offer some degree of added protection.

All specialized equipment must be evaluated by each agency and community as to how best such equipment could be utilized.

Therefore, this plan suggests that all fire departments and/or political subdivisions explore options available to them from a cost versus benefit approach when consideration is given to purchasing such specialized equipment.

Section 3.15 Firefighter and Public Training Certification and Qualification

California offers a full range of training for all positions within the fire service, which is available through the California Office of the State Fire Marshal, Education and Training. This includes all levels of the incident command system and emergency operations management. These standards have been adopted for use by local fire agencies.

Public training for emergency management through Certified Emergency Response Teams (CERT) is available to the general public who choose to be involved. The greatest hindrance in achieving a greater success of this program is having a dedicated emergency manager and ongoing training.

Section 3.16 Defensible Polygons

Left blank for future discussion.

Section 3.17 Fuel Breaks (Strategic/Shaded)

Fuel breaks have a long history in the western United States. The primary reason for fuel breaks as any other type of fuel treatment is to change the behavior of the fire so significantly that, depending upon objectives and purpose of the fuel break, the spread of wildfires would be altered. In a forested area, natural fires have occurred that burn away ground vegetation and forest litter leaving larger more fire-resistive trees to live creating a shaded appearance with minimal understory vegetation. Fuel breaks are not designed to stop the progress of the fire but change the behavior by allowing a greater probability of fire extinguishment from attacking firefighting forces. Fuel breaks differ from the traditional firebreaks. With firebreaks, all vegetation is removed down to mineral soil.

No absolute standard for the width of a shaded fuel break is available. The width and extent of treatment vary dependent upon topography, vegetation structure, potential fuel radiant heat flux, weather potential, crowning potential, economic conditions, and community desires. Discussing fuel breaks of any type and width begins with identifying the current regime class and condition type within the prescribed area. Table 5.1 identifies the regime class and condition class of each management unit within the Big Bear Valley Wildland Urban Interface. Fuel break prescriptions must describe the extent of the fuels to be removed and the residual fuels in the form of the standard fuel models so that potential fire behavior can be analyzed. Post treatment evaluation of the surface fire intensity should be conducted to assure flame length objectives have been met.

Just as important as determining the appropriate width of the fuel break is to increase the height of live crown base by limbing the tree up, reducing surface fuels, increasing the width between live tree canopies of various sizes and ages, and removing all dead, dying & diseased trees within the shaded fuel break.

Section 3.18 Evacuation Plan

The San Bernardino County Sheriff's Department maintains an exhaustive Emergency Evacuation/Reentry Plan for the Big Bear Valley, dated June 2005. During the Old Fire in 2003, the Emergency Evacuation/Reentry Plan for the Big Bear Valley was successfully implemented. A systematic post evacuation review was conducted to evaluate any changes that should be implemented for future events. It was determined that repopulation of the Valley will require further review and plan modification. The agencies involved in the evacuation plan are the Big Bear Lake Fire Protection District, Big Bear City Fire Department, San Bernardino County Fire Department, San Bernardino County Sheriff's Department, United States Forest Service, California Highway Patrol, American Red Cross, CalTrans, and the San Bernardino County Road Department.

Section 3.19 Emergency Communication System / Neighborhood

Since the Old Fire of 2003, the agencies of the Big Bear Valley and the Big Bear Valley Fire Safe Council have incorporated changes in the community's communication system. The first change incorporated the implementation of the Telephone Emergency Notification System (TENS). Essentially, it is a reverse 9-1-1. TENS was implemented to provide telephone notification to all residents of an emergency and to provide specific instructions of what measures to follow during an evacuation.

A second notification system, SCAN USA, is a public warning system that almost instantaneously allows fire departments to broadcast emergency information directly to computers, mobile phones, pagers, and PDAs at no cost to the agencies or the residents. Residents can log onto SCAN USA's website to receive SCAN alerts.

The third community alert system is a Valley-wide siren alert. Because many people work and play outside and many rental homes do not have telephones, relying solely on a telephone callback system may not be enough to reach all Valley residents. The community siren alert system will be strategically placed in four locations throughout the Valley. The goal is that individuals hear the sirens throughout the Valley and tune in to the local radio or TV station for instructions as to what to do. This is similar to the use of sirens for tsunami prone communities. In 2004, a grant was awarded to purchase the siren alert system. Its projected installation will occur in late 2006.

Currently, fire agencies are totally reliant on telephone hard wire system communication between the public and dispatch. Many times, the telephone system has been interrupted and communications have affected emergency response vehicles. Fire officials are encouraged to engage in negotiation with local telecommunications to improve the reliability of the emergency response notification system.

Section 3.20 Safety Plan

Currently, potential areas of safe refuge have been determined Valley-wide by various agencies and are a part of the Emergency Evacuation Plan. All safe refuge areas are considered temporary refuge areas and not a long-term alternative. Long-term evacuation needs are addressed in the Emergency Evacuation Plan or in various other documents. The Emergency Evacuation Plan is a confidential document developed and further refined after the successful mountain evacuation during the 2003 Old Fire. The evacuation plan uses a tiered approach to evacuation, i.e., warning, voluntary, mandatory, immediate, and shelter-in-place.

Section 3.21 Escape Routes

Maps of various escape routes are maintained and distributed based upon the potential each fire could bring. These routes are part of the Emergency Evacuation Plan maintained by the San Bernardino County Sheriff s Department.

Alternate neighborhood escape routes are not as well known by locals and certainly not well known by visitors of the Big Bear Valley. The Emergency Evacuation Plan does not consider neighborhood escape routes. At this time, alternative escape plans would require a possible escort. In the future, consideration should be given to mapping alternative routes and posting signage along the road that identify the route until the route connects to a major thoroughfare.

Section 3.22 Shelter-in-Place Procedure

The current Emergency Evacuation Plan does not consider shelter-in-place procedures as a viable alternative to evacuation except as a last resort.

Section 3.23 Education

One of the key components of the Purpose and Need section of this Plan identifies the need to provide ongoing public education and mass media to provide a sustainable message about a variety of wildland fire safety issues from defensible space, what to take when evacuating, what to do about smoke drift issues, upcoming possible control burns, and forest management issues. Currently the County of San Bernardino with grant funding and through the MAST organization is seeking a marketing firm to assist with long-term public education strategies.

Section 3.24 Fire Safe Council Resources

The Big Bear Valley Fire Safe Council is an active organization that can cross political subdivisions to accomplish short and long term goals of this Plan. They have resources that are available for community-wide public education programs. The Big Bear Valley Fire Safe Council has aggressively pursued the implementation of Valley-wide Chipper Days as well as hosted community informational meetings on the Community Wildfire Protection Plan.

Ongoing plans of the Big Bear Valley Fire Safe Council include continuing attendance at seminars and meetings as well as public education events and hosting Valley-wide Chipper Days. Other activities and projects could be to conduct fuel reduction on private properties and to obtain grants for replacement of more fire resistive roofing as well as educating

citizenry about the need for the reintroduction of fire to both private and public lands. Another idea might be the purchase of Woody the Owl or Chipper the Beaver as a mascot.

Section 3.25 Fire Safe Inspector Program

Fire safe inspector programs have always been a part of the ongoing education program of any fire department. The California Department of Forestry has assigned engine companies to inspect private properties for compliance with the requirements of the Public Resource Code, Section 4291 on State responsibility area lands (SRA). The United States Forest Service applies the same State standards to structures and dwellings located on Forest Service land.

Currently, the Big Bear Lake Fire Protection District and the Big Bear City Community Services District contract out to the San Bernardino County, Land Use Services Department, Code Enforcement Division for abatement of vegetation and other fire hazard abatement issues within the Big Bear Valley. In 2005, the fire hazard abatement process was "kicked up a notch" to include limbing up trees, shrubs, and plants as well as concentrating on the removal of dead vegetation. Problematic with this change was the need for extended administrative personnel hours to explain to the community what was required to comply with the abatement notices. To help explain the changes from past standards, it was evident to the fire chiefs of the Valley that a fire safety inspector position would be beneficial.

Additional projects for the fire safety inspector could include pre-construction inspections, posting of addresses, LPG tank inspections, fire flow analysis, and public education. These types of inspections could identify additional tree thinning and vegetation removal needed to assure that new construction meets vegetation clearance requirements.

Section 3.26 Hazardous Abatement Laws

When it comes to fire hazard abatement and specifically fuel reduction, even though enforcement laws are in place for local fire departments, there remains significant ambiguity within various laws as to meanings of terms and their application. On the other hand, some vegetation clearance laws are very specific, yet not practical for implementation in a wildland intermix setting where trees and bushes are part of the native landscape. Inherently, this poses a problem in enforcement practices. Although standardization of application has occurred between agencies, review and evaluation of creating specific laws and standards that truly fit the communities of the Big Bear Valley would be desirable to enhance the consistency of vegetation clearances and fuel reduction measures.

When evaluating the hazard classification of new and existing development areas of a community, the use of the National Fire Protection Association Standard 1144 or the International Code Council's Wildland Urban Interfaces "Appendix C" provides a systematic approach to evaluating various hazard classifications. Fire protection planners would be advised to utilize either of these standards when determining hazard classifications within the

Wildland Urban Interface subunits. It needs to be stated that although the National Fire Protection Association Standard 1144 or the International Code Council's Appendix C can be used as published, agencies would be advised to evaluate these standards and/or make modifications that would more generally fit local topological, climatological conditions.

Section 3.27 Senior / Disabled Assistance

The Big Bear Valley Emergency Evacuation Plan encompasses the evacuation of senior citizens. During the Old Fire, this task was primarily accomplished by the Mountain Area Transit Authority (MARTA). Furthermore, Bear Valley Electric and the local fire departments maintain information for individuals with special health related needs.

Section 4.0
General Environmental Conditions of the Wildland Urban Interface

Section 4.1 Upper San Gorgonio/Big Bear Mountain Range

This subsection comprises the higher elevations and cooler parts of the San Bernardino mountains. The climate is temperate to cold and sub-humid, MLRA 22d. The following information is provided word for word from the Natural Resource Conservation Service website.

Section 4.2 Topographical

Topographically, the 270 square mile area generally consists of north/south facing slopes. Elevations range from as low as 4,000 feet to 10,200 feet. The major ridges generally run east to west, specifically the Sugarloaf Mountain and Holcomb Valley ranges.

Section 4.3 Lithology and Stratigraphy

This subsection contains mostly Mesozoic granitic rocks. Also, there are some pre-Cambrian Gneiss and Paleozoic marine sedimentary rocks. The mountains are a horst with faults and steep escarpments on the south/southwest, east/northeast, and west/northwest sides. Quaternary non-marine sediments and recent alluvium are small but important components of the subsection.

Section 4.4 Geomorphology

This is a subsection of steep and very steep mountains with narrow to rounded summits. There is a high rolling plateau surface at about 6,500 to 7,500 feet with some Quaternary fluvial and lacustrine deposits on it. The subsection elevation range is from about 4,000 feet

up to 11,502 feet on Mount San Gorgonio. Mass wasting and fluvial erosion are the main geomorphic processes.

Section 4.5 Soils

The soils on the steeper slopes mostly belong to the Inceptisol or Entisol orders. These soils tend to be shallow to moderately deep (20 to 40 inches) over bedrock. They are classified as Xeropsamments, Haploxerepts (formerly Xerochrepts), and Dystroxerepts (formerly Xerumbrepts). The textures of these soils typically range from sandy to loamy with clay contents usually between 5 and 15 percent. A majority of the soils contain 35 to 75 percent rock fragments 1/8 inch to 11 inches in size. Soils on more stable or more protected landscape positions express evidence of increased organic matter production as thicker darker colored surface horizons. In some of these positions, soils have less than 35 percent rock fragments but retain the typical 5 to 15 percent clay contents. The soils are somewhat excessively drained where the depth to bedrock is less to well drained where the soils are deeper.

Soils on flatter slopes share many of the same characteristics as their steeper neighbors. They belong to the Inceptisol and Entisol orders, and have similar classifications, clay contents, and rock fragments. Some of these flatter to nearly level areas have soils, which are represented by the Mollisol order. These soils are usually deep or very deep (40 to 60 or more inches), darker and/or wetter than adjacent soils on steeper slopes. Most tend to have clay contents of 12 to 25 percent and many have less than 15 percent rock fragments. The soils tend to be well drained where the land is sloping and somewhat poorly to poorly drained where slopes become flat to depressional or where water tables are near to the surface.

Most of the soils are lacking in carbonates although in a few isolated places, particularly on the northeast side of the area, there are soils which have both free carbonates and cemented layers where carbonates are an accessory cementing agent.

Soil moisture regimes are xeric with cool, moist winters and warm, dry summers. Most moisture falls during the winter and is particularly effective for leaching the soil. The xeric moisture regime is typical for areas influenced by a Mediterranean climate. Exceptions to the xeric moisture regime are aquic soil moisture regimes in depressional or wet areas where water saturates the soil for a few too many days each year.

Soil temperature regimes are classified as mesic at all but the highest elevations. A mesic temperature regime has a mean annual soil temperature at 20 inches of between 47 and 59 degrees Fahrenheit. The highest elevations (current data suggests above 7,000 feet) have soil temperatures at 20 inches of less than 47 degrees Fahrenheit.

Section 4.6 Vegetation

The predominant natural plant community is jeffery/ponderosa pine series. There are small areas of coulter pine series, mixed chaparral shrub lands transitioning to the east where there are juniper/pinion woodlands. Some fir and lodgepole pine series are common in the north facing higher elevations.

Characteristic Series by Life Form Include:

Grasslands: Alpine habitat, beaked sedge, bur-reed, creeping ryegrass, shorthair sedge, sedge, and tufted hair grass series.

Shrub lands: Big sagebrush, black sagebrush, bush chinquapin, deer brush, eastwood manzanita, green leaf manzanita, interior live oak - chaparral whitethorn, interior live oak - canyon live oak shrub, interior live oak - scrub oak shrub, mixed saltbush, mixed scrub oak, mountain whitethorn, rothrock sagebrush, rubber rabbit brush, scrub oak, and scrub oak - chamise series.

Forests and woodlands: Aspen, black cottonwood, black oak, coulter pine - canyon live oak, curlleaf mountain-mahogany, incense-cedar, jeffrey pine, ponderosa pine, limber pine, lodgepole pine, mixed conifer, mixed subalpine forest, mountain juniper, singleleaf pinion, and white fir series.

Section 4.7 Climate

The mean annual precipitation is about 30 to 40 inches. Much of the precipitation is in the form of snow. Mean annual temperature is about 40° to 50° Fahrenheit. The mean freeze-free period is about 150 to 200 days.

Section 4.8 Surface Water

Runoff is rapid. All but the larger streams are dry through the summer. There have been natural lakes on the high plateau recently, but any lakes that persisted until historical time have been replaced by reservoirs. The major body of water is Big Bear Lake. Baldwin Lake is a relatively shallow body of water and becomes a dry lake during periods of low precipitation.

Section 4.9 Underground Aquifers & Water Shed

A critical component of the National Fire Plan is the need to maintain the nation's watersheds. The watershed of the Big Bear Valley is critical to the survivability of the Big Bear Valley economy. A Geoscience Report, *"Re-evaluation of the Maximum Perennial Yield of Big Bear Lake and a Portion of Baldwin Lake Watershed"* August 2001 identifies the maximum perennial yield of each subunit within the Big Bear Valley. This report further identifies that, for the most part, the aquifers are distinctly separated into an upper and lower

aquifer. The significance is that the main domestic use aquifer is the lower aquifer. Its primary recharge occurs from deep percolation of runoff where the bedrock is in contact with the alluvium. Most generally, this is thought to occur high in the mountains above the Big Bear Valley floor.

Although the above research explains the use of the lower aquifer, the alluvium aquifer (upper level aquifer) percolation is intercepted by the vegetation and development that occurs aboveground. Little is known about the amount of absorption of such vegetation. No research is known to analyze the estimated volume that vegetation consumes nor are there estimates of the increase of available water, as a result of providing a treatment of the forest.

The overly dense forest structure that has not burned in the last 105 years could be said to have intercepted and/or retained its maximum capacity, logically depriving historical levels of water from percolating to the lower aquifer. However, the 2004/2005 rainfall statistics, which were 150% higher than normal, indicate that the water table in the lower aquifer has mostly risen back to normal levels. Yet what remains at issue is that the narrow residual estimated perennial yield of the defined aquifers versus estimated annual use leaves little to no differential from the potential impact that a large fire could cause.

Section 4.10 Threatened and Endangered Habitat Types

Within the Big Bear Valley Community Wildfire Protection Plan, there are over thirty-nine species that are listed in the Endangered Species Act. There are also sensitive species listed by the San Bernardino National Forest, the Watchlist, the Management Indicator Species (MIS), and the Land Birds (Neotropical Migrants) list.

This Plan proposes the continual implementation of the environmental review of any treatment projects to assure the ongoing safety of the wildlife species.

Yet, when a fire occurs, the current fuel loading and tree density of the forest could potentially have irreparable and long lasting impacts to the listed environmental species. Certainly, the tree density has led to an increase in insects and disease agent populations beyond historic levels.

An example of the type of ecosystem damage that could occur is evident in the once beautiful Cedar Glen area. The picture to the left illustrates the ecosystem damage that a high intensity fire causes.

The Big Bear Valley Wildland Urban Interface ecosystem is currently susceptible to the same type of damage that occurred in Cedar Glen. The forest vegetation structure on the north-facing slope of Big Bear Valley is presently in a high departure state from normal levels. The suppression of

fires and the absence of removing fuels have created an environment that, when a fire occurs, will be difficult to control and that all types of vegetation within the areas which are in a high departure state are likely to ignite and burn.

Section 5.0 Present Forest-wide Conditions

A large portion of the Big Bear Valley Wildland Urban Interface has not burned in well over 105 years and has missed approximately four fire intervals in the conifer or mixed conifer vegetation structure. According to the California Department of Forestry (FRAP) data derived from the United States Forest Service material, 42% of the Big Bear Valley Wildland Urban Interface is a Fire Regime I; 47% is a Fire Regime III; and 3% is in Fire Regime IV. For definitions of a fire regime, please refer to the Definitions section at the end of the document. Even without the drought and tree mortality issues, this is considered high fire hazard conditions with old decadent brush, heavy fuel loadings, and over-densification of trees that have not been comprehensively treated for a number of years. Although the Grand Prix and Old Fires were large fires, 70% of the fires burned in chaparral and affected only 3 to 4% of the areas with timber, leaving a large part of the forest unburned.

Map 5.0 Old fire and Grand Prix Fire Boundary

The records of large fires in the San Bernardino National Forest over the last 105 years indicate that no large fires (those fires greater than 300 acres) have occurred within Big Bear Valley, the heart of the Big Bear Valley Wildland Urban Interface. Table 5.0 indicates the approximate decade of each fire that has occurred in the last hundred and five years, the number of large fires over the last century, the approximate average size, and the total acreage burnt per decade. With this information, one could conclude that the infrequency of large fires has made the Big Bear Valley susceptible to a potential catastrophic fire.

The increase mean fire acreage per decade is one indication of the causal relationship of increasing fuel loading causing greater fire intensity which leads to difficulty in extinguishing the fires. Although intensity does not always equate to size, it does equate to the destructive ability that even smaller fires can cause damage. Evidence of a smaller fire (100 acres) in the Baldwin Lake area in the mid 1980s caused numerous homes to be destroyed but was not large enough to be included in Table 5.0. Over the last 25 years, no large fires have occurred in the Big Bear Valley. The reason for this could be a result of the introduction of aircraft, better firefighting equipment, an emphasis on increased coordination, and/or fire suppression training. Whatever the reason, it could be said it s because our firefighters apply effective modern tactics and strategies.

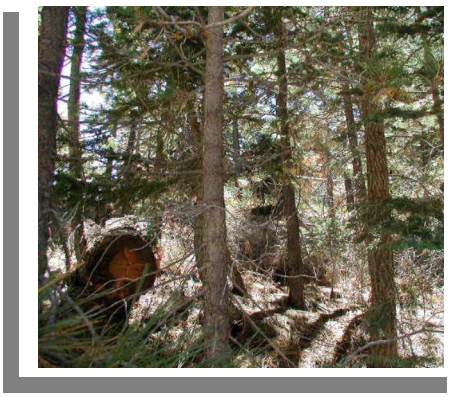
Table 5.0 – Big Bear Valley (WUI) Fire History from 1900 to 2004

Decade	Number of Fires	Total Acres	Mean Acres/Fire
1900-1919	13	1,586	122
1920-1939	2	1,463	732
1940-1959	13	18,181	1,399
1960-1979	21	60,105	2862
1980-1999	23	78,625	3,418
2000-	1	16	16

Section 5.1 What is the fire and fuels problem?

Recent history has seen an increasing trend of record breaking wildfires on public forests and grasslands nationwide. In 2002, wildfires on our nation s forest burned 7.2 million acres in seven western states.

Locally in 2003, the Old Fire and the Grand Prix fire combined to create a conflagration of approximately 150,729 acres. It is estimated that only 3-4% of the Old Fire burned in timber stand concentration. Although this can be seen as positive, it can and does mean that within the Big Bear Valley Wildland Urban Interface, fire, a natural occurrence as a result of lightening strikes in past generations and used by Native Americans, has been significantly inhibited from naturally burning away fuels such as pine needles, twigs, brush, saplings, branches, snags, and down dead trees that accumulate on the forest floor. These burnable fuels have not been removed in decades. This inhibition is most likely a result of aggressive fire suppression efforts.



Just as important in any discussion concerning accumulation of fuels is the prohibition to harvest live, over-dense tree stands in the forest. An example of this is indicated in the South Big Bear Fuels Reduction Reports Environmental Assessment that indicates Many of the low-departure stands that are on dry, low productivity sites were heavily logged in the 1960s. Prohibiting consumptive use of a renewable natural resource can/does contribute to the changes in the historic vegetation structure. The build-up and accumulation of unnatural historical vegetation structure ultimately has an accumulated effect on the forest health causing existing live vegetation to compete for the same nutrients and water. An over-dense vegetation structure reduces the vegetation s ability to resist disease and insects like the bark beetle. Thus, an increase in the forests vegetation mortality rate can be predicted as well as an increase in insects and bark beetles.

Over-densification of the vegetation effectuates an increase in the populations of insects including bark beetles and other disease agents beyond historic levels. Thus unnatural accumulation of dead fuels over time has occurred to the point that the condition class within the WUI is significantly modified. It is estimated that in some areas, 50 to 120 tons of burnable fuel per acre has been left to accumulate. In accordance with the United States Forest Service, the forest within the Big Bear Valley Wildland Urban Interface has been "significantly altered from the normal range" (see Table 5.1). The Big Bear Valley communities are now listed in the Federal Register as communities at "high risk".

The most extensive and serious problem related to health of the national forests in the interior west is the over-accumulation of vegetation, which has caused an increasing number of large, intense, and many times uncontrollable and catastrophically destructive fires. All vegetation, whether live or dead, serve as fuel for fires. In a natural state, a Jeffery/ponderosa pine tree forest consists of open stands of large diameter older trees with very little undergrowth. The burnable fuel in this type of forest is minimal. In contrast, the forest within the Big Bear Valley Wildland Urban Interface today consists of burnable fuels that are four times the historic levels.

There is new tree mortality in multiple areas, but for the most part, it is within affected areas observed in 2004. Many of the older standing dead trees (3 months or more) are losing needles. Trees that have recently died are still holding onto their needles, and some green trees that appear to be alive are, in fact, dead. You can see this across much of the forest. North facing slopes where we normally find higher live fuel moistures are experiencing high mortality. It would be best to describe the timber mortality as standing heavy slash or a "Vertical Fuel Model 13". The Fuel Model Matrix identifies per management unit the amount in acres of the various fuel models within the Big Bear Wildland Urban Interface. Combined, the standing and down dead fuel loadings could equate to several hundred tons of fuel per acre.

TABLE 5.1 BIG BEAR VALLEY WILDLAND URBAN INTERFACE FIRE REGIME AND CONDITION CLASS PERCENTAGE BY MANAGEMENT UNIT*

Management Units	Fire Regime**	Condition Class 1 %	Condition Class 2 %	Condition Class 3 %	Condition Class 9 %
Baldwin Lake/ Erwin Lake	I/III	4	50	27	19%
Lone Valley	I/III/IV	6	82	12	0
Sugarloaf	I/III	15	41	29	15
Moonridge	I/III	12	8	42	38
Big Bear City	I/III	12	34	10	44
Big Bear Lake	I/III	6	7	60	27
Fawnskin	I/III	10	54	31	5
Gray's Peak	I/III	13	11	72	4
Mill Creek	I/III	19	24	55	2
Holcomb	I/III	12	56	30	2
Santa Ana	I/II/III	18	44	37	1

***Fire Regime and Condition Class information provided by the California Department of Forestry, Fire Resource and Assistance Program (FRAP)**

****The Fire Regime in Table 5.1 is identifies the primary class in forested areas.**

SECTION 5.2 AIR QUALITY

The South Coast Air Quality Management District (SCAQMD) is the regulatory agency that monitors air quality within the BBVWUI. Any and all approvals on prescriptive burns would require approval from the SCAQMD.

SECTION 5.3 NATURAL RESOURCE MANAGEMENT

The use of forest products has seen a decline. The last large scale local mill closed in the early 1980s after environmental constraints reduced the supply of timber to the point that it was no longer economically viable to continue the milling operation. The harvesting of the wood/timber from private property was the only remaining option. Small boutique businesses use wood for woodcarvings and firewood, but for the most part, up until 2000, the use of wood /timber was limited. Issuance of a permit for harvesting Christmas trees is not allowed in spite of an overly dense forest of small trees.

In the San Bernardino National Forest, the drought and bark beetle infestation left an estimated 13 million trees across the forest dead - trees of all sizes and age. There were insufficient harvesting companies to remove the trees. Local governments were limited and perplexed on what to do with the trees. Many trees were not useful due to type, size, and condition after they died. Burying or leaving them in their natural felled position to litter the forest floor was and remains a vital economic solution to some, but it does little to reduce the

burnable fuels in our forest. Local governments purchased incinerators, chippers, and initially helped fund small sawmills. Private companies looked into biomass electric generation but were frustrated by federal & state bureaucracy, regulations, and/or red tape. To operate such a process would require a guarantee from public land managers to provide a sustainable supply of wood biomass from public lands. San Bernardino National Forest representatives met with several biomass co-generation firms early in the tree mortality event. One failed to produce a business plan as was needed to evaluate their proposal; another indicated that they needed a guaranteed biomass stream of such quantity and duration that extensive and costly environmental analysis would be required, and they appear to have lost interest in committing the level of investment necessary to pursue the matter further.

Meanwhile, the wood has been backing up in firewood businesses in and around Big Bear. Some businesses have been offering free wood and chips just to get rid of them. Small milling operations have begun to operate. The Inland Empire Council for Boy Scouts operates a small mill at Camp Emerson in Idyllwild. Milling operations for wood pallets and crates have used some portions of the forest products. Some trees are shipped to Terra Bella in central California for milling. Some material is shipped to a co-generation facility in Thermal, California as long as shipping is provided.

Privately in and around Big Bear, tree trimmings and slash are part of the solid waste stream. Little is done to separate this biomass from the rest of the trash and use it in a beneficial manner. Biomass continues to be a key community issue to overcome. There is a need for both public land stewards and private landowners to work together with business interests to seek viable and sustainable solutions for the reuse of biomass material. Help is on the horizon with the completion of the "Southern California Biomass Disposal and Utilization Assessment" conducted by TSS Consultants. This report can assist Southern California agencies in developing plans to market and utilize biomass materials at a local, state, and regional level.

6.0 What is Fire Safety?

How to be ready when fire comes.

6.1 Before Fire

6.1.1 Defensible Space

Creating defensible space is one of the two most important actions that a homeowner can create before a fire occurs in order to decrease the likelihood of an ignition around their home. Developing a WUI standard for defensible space that works for Big Bear Valley which meets state and local statutes as well as the vegetation landscape of the Bear

Valley intermix and is clearly enforceable remains a high priority of the Big Bear Valley Wildland Urban Interface.

6.1.1.1 Legal Requirements

Legal requirements vary within the communities of the Big Bear Valley. The use of Public Resources Code, Section 4291, applies to private lands in unincorporated areas of the Valley. Furthermore, the County of San Bernardino enforces a vegetation ordinance for use in the City of Big Bear Lake, the Big Bear City Community Services District, and in the unincorporated area of the Valley. In addition, agencies have adopted the California Fire Code, which contains Appendix II-A. Appendix II-A contains various requirements for the suppression and control of fires in a hazardous fire area. The City of Big Bear Lake has adopted a separate fire hazard abatement ordinance similar to the County ordinance in addition to the adoption of Appendix II-A.

The City of Big Bear Lake has a tree conservation ordinance that establishes certain criteria for the conservation of trees, and the Development Code grants the authority to provide thinning of overly dense trees on private properties at the time of construction.

Another consideration for Valley fire agencies is to adopt the Wildland Urban Interface Code published by the International Code Council or adopt National Fire Protection Association Standards.

The County of San Bernardino Fire Department has adopted the 1991 edition of the Uniform Fire Code as compared to the Big Bear City CSD Fire Department and the City of Big Bear Lake Fire Department that have adopted the 2001 edition of the Uniform Fire Code as amended by the State of California. When assessing the significance of San Bernardino County not adopting the most current code, one can easily see that the layering of other County or State adopted laws and regulations fill the gap created by their political bodies' denial of the adoption of the 1994, 1997, and 2000 editions of the Uniform Fire Code, yet it complicates the process at the enforcement level. Thus it slows down the approval processes for new and existing construction, fosters obsolescence, and creates difficulty approving technological advancements.

In 1995, the enactment of certain state laws required the California Department of Forestry to identify lands that are considered as a "Very High Fire Hazard Severity Zone". The Big Bear City CSD Fire Department adopted by ordinance the "Very High Fire Hazard Severity Zone" criteria. This is in contrast to the Big Bear Lake Fire Department, which did not adopt the criteria.

Furthermore, the Pubic Resources Code was recently modified to require 100 feet clearances around structures.

The California Office of the State Fire Marshal has developed a series of guidelines for agencies to use within a hazardous fire area.

In August 2001, the Federal Register listed only the communities of Big Bear City, an unincorporated area and the incorporated community of the City of Big Bear Lake in its list of communities at "high risk". Communities such as Baldwin Lake, Fawnskin, and Erwin Lake were not specifically identified, yet meet the criteria for inclusion as a community at risk.

This emphasizes the layering of laws and regulations that frustrate agencies and departments when talking to the public about creating defensible space. The challenge for the BBVWUI is to identify differences in various regulations and implement practical solutions.

6.1.1.2 Fire Resistant Landscaping

The Big Bear Valley fire agencies have begun aggressively communicating the need for private property owners to reduce the overgrown vegetation maintained on properties within the Big Bear Valley. Mass media campaigns with Valley fire agencies and the Big Bear Valley Fire Safe Council have begun informing property owners what they need to do to create defensible space. Fire resistant landscaping starts with the elimination of pine needles, leaves, and dead vegetation. Limbing up trees and bushes as well as removing over-dense trees is all part of creating a fire resistant landscape.

With the high density of structures, small lot sizes, and properties with side yard setbacks being a minimum of three feet for older subdivided properties, utilizing standard printed materials that show houses with clearances around them up to 100 feet, creates unique challenges when communicating "how to create fire resistant landscaping" and defensible space guidelines. The primary reason is that intermix landscape preprinted universally used brochures do not fit the communities of the Big Bear Valley.

Valley officials and community stakeholders are working on developing materials that explain "how to create fire resistant landscaping" and defensible space that meets an acceptable standard. Since all live or dead vegetation will burn, officials are guarded to use plants that may be the "lesser of two evils" when recommending plants in and around structures.

6.1.1.3 Separation Requirements vs. Vegetation

Currently, the fire agencies of the Big Bear Valley utilize the requirements within the California Fire Code and/or the Public Resources Code 4291 to assure proper vegetation clearance from structures or hazardous materials. The following requirements in Table 6.1 are some of the spacing requirements required by law.

The County of San Bernardino and the Big Bear City Community Services District have adopted standards on distances from structures for firewood. The County's Fire Safety Overlay requirements establish a 30 feet minimum separation from structures while the CSD requires 20 feet separation. Yet neither of these requirements is strictly enforced. The City of Big Bear Lake has no specific requirement for firewood separation from structures.

Table 6.1 List of Separation Requirements from Vegetation

Reference Section	Clearance by Type	Separation Distance
Section 7904.2.5.4.1 CFC	Class I Class II Liquids	50 ft. min.
Section 16 CFC Clearance of Brush CFC	Flammable vegetation Combustible vegetation	30 ft. to 100 ft.
Section 16 II A CFC	Remove Limbs	10 ft. from chimney outlet
Section 17 II A CFC	Brush clearance from roadways	10 ft. min.
Section 15 II A CFC	Clearance around electrical lines	10 ft. min.
Section 8209 CFC - LPG	Clearance from LPG tank/ containers from combustibles	10 ft. min.
Section 8003.1.12 CFC Hazardous Materials	Clearance of vegetation from hazardous materials outdoor storage area or tanks.	30 ft. min.
Section 3008.4 CFC Storage of Wood Products	Clearance of vegetation	As determined by the Chief
Unincorporated Areas Fire Safety Overlay Section 85.020220	Minimum setback requirement from property line. Minimum distance between buildings. Minimum setback from National Forest boundaries.	Minimum 5 ft. Minimum 10 ft. Minimum 30 ft.

6.1.1.4 Recommended Building Materials/Fire Wise Construction

The current building material used to construct the majority of the buildings within the Big Bear Valley Wildland Urban Interface is wood frame construction with exterior surfaces being of T-111, masonite, exterior wood facade, vertical wood shake, shingle, etc. The building requirements are different in the City versus the County unincorporated area. The Uniform Building Code currently used is the 2001 California Building Code. It is adopted Statewide. The County has enacted a more restrictive development code for areas in a high fire hazard area. These high fire hazard requirements have been utilized since 1989 and are applicable throughout the unincorporated areas, including the CSD. These requirements include the installation of Class A roof coverings, the elimination of eave vents, multi-pane windows, and upgraded roofing requirements to meet current standards when replacing

existing roofing material and/or constructing a new addition. The City of Big Bear Lake has similar standards in place as well.

Yet, none of the agencies have adopted a "future effect" clause that would mandate the replacement of organic shake shingle roof coverings to be replaced by an established future date. Rather they have opted to allow a natural attrition process and/or encouragement from the insurance industry to be the motivational factors behind removing the organic or shake shingle roof material.

The two most important pre-disaster mitigation actions that can be accomplished that have the greatest ability to reduce structural ignitability is (1) the removal of existing shake shingle roofs; and (2) the creation of defensible space. Dwellings within communities at very high risk to a wildfire that have organic or shake shingle roofs subject the whole community to a continual threat.

The most compelling evidence documented on the effectiveness of non-combustible roofing versus shake shingle roofs is explained in an article titled, "Preventing Disaster" by Jack Cohen, published in the Journal of Forestry. Cohen states that effectiveness of a non-flammable roof versus shake shingle is approximately 3.68 times more effective at preventing structural ignition. In other words, 368% less likely that damage, losses, and casualties will occur in dwellings without shake shingle roofs.

6.1.2 Water Sources

The available types of water sources are lakes, streams, ponds, public water distribution systems, private wells, storage tanks, and water tenders. Generally, these sources are all utilized during a wildland fire. Non-hydrant areas in the San Bernardino County area are allowed to install a 3,000 gallons water tank or an FX type fire sprinkler system. These systems will suppress fire in an interior origin; however, long-range consideration should be given to providing water storage capacity and installation of water mains and fire hydrants in existing subdivisions for wildland fire scenarios.

6.1.3 Community Emergency Response Teams (CERT)

See Page 23.

6.1.4 Personal Tools, Equipment, and Fire Protection Clothing

Fire protection clothing is generally available only to fire department personnel. A small cache of old fire protection clothing is maintained. Setting aside a significant cache for appropriately trained volunteers is recommended. Until this is accomplished, alternative equipment may be purchased at local hardware stores.

A preliminary equipment list may include rakes, shovels, power tools, gloves, hardhats, and breathing masks. Clothing that will provide some semblance of protection is long sleeved cotton shirts, cotton pants, boots, gloves, etc., all of which would most likely be brought from home by individuals.

A list should be developed as part of the emergency preparedness plan for implementation during emergencies.

Section 6.2 Emergency Communication

Currently, the alarm dispatch system to each station is the only available method of receiving alarm notification for both the Big Bear Lake and the Big Bear City Fire Departments. The alarm notification is 100% reliant on a proper working telephone system. At this time, the activation of the alarm is sent from dispatch (approximately 80 miles away) via telephone lines due to lack of a repeater system in place to a local alarm activation point which then is broadcast through the airwaves to a tone activated fire station.

There is need to have two alarm dispatch circuits to each fire station. For many years, the Insurance Services Office statements have identified a need to add a second circuit. Furthermore, NFPA 1221 states that any jurisdiction that receives more than 730 alarms per year shall provide two separate and dedicated dispatch circuits where the failure of one circuit does not affect the operation of the other. The upgrade to the current dispatch/communication system is underway.

Section 6.3 Evacuation / reentry Plans

A critical component of an emergency fire scenario is evacuation. The legal authority for evacuations is the San Bernardino County Sheriff's Department. A practice instituted by policy for any fire response is the active deployment of law enforcement personnel during any fire scenario within the mountain communities of the San Bernardino National Forest. The latest edition of the evacuation/reentry plan is dated June 2005.

Section 6.4 Mitigation Strategy Action Plan

The Big Bear Valley Wildland Urban Interface is comprised of eleven management units. Within each management unit and across the WUI, various priorities have been identified that require implementation to mitigate or prescribe the particular remedy that is most appropriate for the specific condition that one is trying to achieve.

Priorities in each management unit are as identified in the Plan's Purpose & Statement and herein reiterated.

General Purpose

- Ensure the long-term economic stability of the communities by reducing the fire threat risk from very high to moderate/low.
- Identify lands private, public, forested, urbanized or otherwise that, if treated, would reduce the potential fire impact to communities and structures in and around the Big Bear Valley. This is commonly referred to as the Wildland Urban Interface (WUI) zone.
- Implement fuel reduction measures to assure continuing and ongoing safety of the Big Bear Valley watershed and recharge aquifers.
- Identify high valued areas that, if absent from trees, would have a detrimental effect on the appearance and ambiance of the communities of Big Bear Valley. Propose and implement measures to assure the long-term survivability of these areas.
- Identify and support new markets that collectively, with public and private partnerships, assure that the forest vegetation and trees that are removed go to sources that have a beneficial use, i.e., lumber, biomass chips for landscaping and erosion control, and/or energy.

Buildings

- Review, evaluate, and modify fire wise building codes and fire protection laws for private landowners/builders to reduce home ignitions.
- Review, evaluate, and make recommendation for a fuel reduction and vegetation management/landscape ordinance.
- Design and develop a list of building standards that existing homeowners can voluntarily install to reduce the vulnerability of their homes.

Healthy Forest needs

- Develop and prioritize fuel treatment programs on National Forest lands using Forest Service practices within the Big Bear Valley Wildland Urban Interface. For fuel treatment prescriptions on private lands, individuals are required to follow Title 14, State Forest Practice Act.
- Implement treatments within the Big Bear Valley WUI to revitalize forest health on both public and private lands. Treatments should promote a mixed age class stand with healthy stocking levels that supports multiple forest resource values such as forest products, esthetics, water, wildlife, recreation, etc.
- Support the reintroduction of prescriptive and controlled fire into the ecosystem of the Big Bear Valley Wildland Urban Interface on both public and private lands.
- Incorporate as much as possible a “do more with less” concept by privatizing “off budget” management and treatment prescriptions of the forest.

Section 6.5 Mitigation Goal

The implementation of the Plan's goals and objectives may in fact take a village to implement. It will be incumbent on all of us to do our share. Cooperation of governmental agencies, fire safe councils, watershed councils, public/private partnerships, the Big Bear Valley Mountain Mutual Aid Association, National Resource Conservation Service, non-governmental organizations, homeowners' associations, and general citizenry will be necessary in order to reduce the threat of a wildfire. The following are some of the ongoing projects that various organizations have done or are doing to make the BBBWUI a more fire wise WUI.

Table 6.5 CWPP PROJECTS MATRIX
March 2006

Project Description	Responsible Party	Acres Under Analysis	Thinning	Brushing	Agency Involvement	Proposed Timelines*	Estimated Cost	Management Unit Name	Projects Status
		ACRES							
Barton Flats	USFS	3947				2005	TBD		
BB Healthy Forest Treatment #1	USFS	492				2005	TBD		
BB Healthy Forest Treatment #2	USFS	670				2005	TBD		
BB Healthy Forest Treatment #3	USFS	3037				2005	TBD		
BB Interface	USFS	780				2005	TBD		
BB Skyline 1	USFS	534				2005	TBD		
BB Skyline 2	USFS	86				2005	TBD		
BB Tract South	USFS	66				2005	TBD		
BB Tract Center	USFS	104				2005	TBD		
BB Tract North	USFS	91				2005	TBD		
Bear Mountain	USFS	917				2005	TBD		
Fawnskin NW	USFS	927				2006	TBD		
Glory Ridge Fuels Reduction	USFS	998				2005	TBD		
Lakeview West	USFS	122				2005	TBD		
Lakeview East	USFS	50				2005	TBD		
Metcalf	USFS	183				2005	TBD		
Pine Knot	USFS	34				2005	TBD		
Snow Summit	USFS	611				2005	TBD		
Willow Glen	USFS	16				2006	TBD		
Bertha Ridge	USFS	3333				2006	TBD		
Childrens Forest	USFS	197				2006	TBD		

Table 6.5 CWPP PROJECTS MATRIX
March 2006

	Responsible Party	Acres Under Analysis	Thinning	Brushing	Agency Involvement	Proposed Timelines*	Estimated Cost	Management Unit Name	Projects Status
Lake Erwin & Lake Williams	USFS	2764				2006	TBD		
Nelson Ridge & Baldwin Lake	USFS	1430				2006	TBD		
Pinyon Ironwood Fuelwood Sale	USFS	539				2006	TBD		
Santa Ana / Clarks Grade Fuel Modification	USFS	1500				2006	TBD		
Sawmill	USFS	293				2006	TBD		
Section 17	USFS	522				2007	TBD		
Bluff Lake	USFS	1272				2007	TBD		
Grays Peak	USFS	2801				2007	TBD		
Holcomb West	USFS	2407				2007	TBD		
Poligue Canyon	USFS	39				2008	TBD		
Heart Bar	USFS	4214				2008	TBD		
Snowslide	USFS	7243				2009	TBD		
Delmar Mountain	USFS	2839				2009	TBD		
Holcomb Valley	USFS	3472				2009	TBD		
Onyx Peak	USFS	975				2009	TBD		
Wildhorse	USFS	5099				2010	TBD		
Arrasre Flat	USFS	7722				2010	TBD		
Santa Ana River	USFS	4186				2008	TBD		
Public Education									
Valley-wide Public Education Progran	BBLFD					2005			
Big Bear City Fire Departmnet						2005			
Fire Safe Council						2005			

Table 6.5 CWPP PROJECTS MATRIX
March 2006

	Responsible Party	Acres Under Analysis	Thinning	Brushing	Agency Involvement	Proposed Timelines*	Estimated Cost	Management Unit Name	Projects Status
Thinning Projects									
Bear Valley School District	BLFD, BBC, CD					2005			
Valley-wide Vegetation Abatement	BLFD, BBC, SBC					2005			
Shore/Big Bear Blvd.	BBC	Yes/ 15	BBC,BBL SCFD			C	14,000		C
Shore/Big Bear Blvd.	BBC	/15	BBC,BBL SCFD			6/7/2007	Unknown		Marked
Shay Road	BBC	/ 5	Yes	BC,BBL SCFD		C	9,000		C
Peery Reservoir	BBC/BBL	Yes/1	Yes	BC,BBL SCFD		C	6,000		C
Structure Ignitability Projects									
Structural Ignitibility Demonstration	BBLFD					2005			
Apply for grant to replace shake shingle/orgainic material on roofs	VFSC, BBC, BBL								Ongoing
Fuel Modification Projects									
Condition of Approval - all new developments will be required to submit a fuel modification plan	BC,SBCFD,BB	Yes	Yes	N/A	Ongoing				
Infrastructure Improvement Projects									
Valley-wide siren system that is intended to notify the public to tune into local radio or TV stations in order to receive information of public concerns including fires, earthquakes, or other emergency situations	BBLFD/BBCFD								
Fiber optic installed which increases reliablity of the communications link with the Valley's dispatch center in Victorville	BBLFD								

Table 6.5 CWPP PROJECTS MATRIX
March 2006

	Responsible Party	Acres Under Analysis	Thinning	Brushing	Agency Involvement	Proposed Timelines*	Estimated Cost	Management Unit Name	Projects Status
A portion of th Valley's radio communications are currently via telephone lines. For added reliability, BBLFD received a grant to install a redundant radio repeater system which would operate independent of the fiber optic system.	BBLFD								
Industrial Resource Management									
Forest Products Utilization									
Valley-wide Chipper Days	FSC					2004/06			
Property owners list for chipped material									

Table 6.5 CWPP PROJECTS MATRIX
March 2006

	Responsible Party	Acres Under Analysis	Thinning	Brushing	Agency Involvement	Proposed Timelines*	Estimated Cost	Management Unit Name	Projects Status
Slash/Biomass Disposal									
Apply for grant assistance homeowners' vegetation removal	BBL	Yes	Yes		BBLFD				
High Value Area Projected									
Spray protection for 1,000 trees	USFS								C
Seek funding for spraying high valued areas	BBLFD, BBCFD, BBVFSC								
Fire Safety Inspection Program									
A time of a new construction - an inspection is conducted, trees marked, and direction is given to limb up trees and bushes by final	BBLFD	Yes	Yes			2005			
All new construction must comply with requirements in Fire Safety Overlay #1 San Bernardino County Development Code	BBCFD, SBCFD								

Table 6.5 CWPP PROJECTS MATRIX
March 2006

	Responsible Party	Acres Under Analysis	Thinning	Brushing	Agency Involvement	Proposed Timelines*	Estimated Cost	Management Unit Name	Projects Status
All new construction must comply with BBCCSD Ordinance 212 - directs the Fire Chief to require fire sprinklers to mitigate lack of fire flow	BBC				BBC				

***The proposed timelines herein are subject to change based upon compliance with the National Environmental Policy Act and/or available funding.**

Section 6.6 Current Projects Prioritization Process

Projects within all management units should follow the goals and objectives of the Big Bear Valley Community Wildfire Protection Plan. Funding, responsible legal authority, complexity of the projects, and proposed length of projects will arguably be the more determining factor in developing and implementing projects on an ongoing basis.

Generally, agencies, organizations, and individuals should meet quarterly to discuss the projects that are planned or being implemented to reduce overlap and foster an environment of cooperation.

If a proposed project/plan is within a political subdivision or is to be utilized within a political subdivision, rather than going through a prioritization process, approval from only that specific governing board would be required for the project or plan to move forward.

Proposed fuel treatment projects on federal lands must follow National Environmental Policy Act (NEPA) guidelines. Each agency/individual will have their own ability to comment pro or con on various upcoming projects as they are proposed.

Fuel reduction projects on private properties should follow vegetation reduction practices established by law within that particular political subdivision and the California State Forest Practices Law. An environmental review may or may not be required.

Those projects that could be utilized within all or some management units would require approval from the organization's board that supports the project and concurrence by possible affected political subdivisions, if any exist.

Big Bear Valley agencies within the Big Bear Valley Wildland Urban Interface shall collaborate on planning and operations of prescriptive burning within the BBVWUI. This is for both private and public land prescription. Campfires, stoves, barbecues or permitted fires are excluded from this requirement.

Section 7.0
Big Bear Valley Fire Protection Plan Recommendations

Section 7.1 Mitigation measure 1

Big Bear Valley Fire Protection Plan

- Continue to refine, update, and circulate the Big Bear Valley Community Wildfire Protection Plan on an annual basis between the Sheriff's Department, fire departments, Fire Safe Council, governmental agencies, and other appropriate public stakeholders. As a common resource, the Community Wildfire Protection Plan will help local and federal government agencies:

- Prioritize and coordinate mitigation treatments on private/public lands to reduce fire risks and promote biodiversity.
- Provide decision-making data for the stakeholders.
- Identify resource gaps.
- Protect and manage community "values at risk" such as residences, watersheds, archeological or historic sites, view corridors, recreation resources, and wildlife habitat.
- Provide common reference and direction for fire suppression effort between fire districts and federal fire management officers.

Section 7.2 Mitigation measure 2

Develop and Sustain a General Public Education Campaign and Concentrate Special Efforts in Areas Identified as High Threat

Expanding the use of public education tools already in place is an immediate action step that can be taken. Publications and videos are available and can be found via the Internet.

Additional steps may include:

- Development of an educational presentation booth to be used at various public events. Such a display may include photo documentation of good mitigation work examples and graphic illustrations of "fire wise" homes.
- Place feature articles in local newspapers dealing with wildfire preparedness to maintain a high level of fire awareness at the community level on a regular basis.
- Provide information to property owners about the need for fire wise construction standards, laws, and codes.
- Through public education and enforcement efforts, maintain ongoing practices of assuring the removal of overgrown vegetation and fuel loading on private lands. Emphasize defensible space clearing on private lands within the Big Bear Valley.
- Monitor, report, and educate citizenry on changes in the biodiversity evidenced within the Big Bear Valley Wildland Urban Interface.
- Seek as needed assistance from the Natural Resource Conservation Service on monitoring and implementing ways to educate citizenry on methods and techniques to help reduce soil erosion.
- Informational briefs and videos can be broadcast over the community closed circuit television station.
- Integrate "fire wise" education into school curriculum. Involve local clubs such as Boy Scouts, Girl Scouts, school based clubs, etc.
- Work with homeowner associations, builders, realtors, and a door-to-door outreach program to individual landowners in an effort to jumpstart word-of-mouth community networking.
- Develop highly visible ongoing demonstration projects.

Section 7.3 Mitigation measure 3

Develop measures to reduce fire hazards in future developments

- Review, evaluate, and modify fire wise building codes and fire protection laws unilaterally for private landowners/builders to reduce home ignitions.
- Review, evaluate, and make recommendation for a fuel reduction and vegetation management/landscape ordinance.
- Design and develop a list of building standards that existing homeowners can voluntarily install to reduce the vulnerability of their homes.
- Adopt a future effect clause for the replacement of organic or shake shingle roofs. Seek funding sources to help mitigate cost.
- Adopt an ordinance that mandates the development of a landscape plan on all new dwellings.
- Implement a Wildfire Hazard Rating Assessment for each proposed management unit of the WUI outlining mitigation measures to be undertaken across the entire subdivision.
- Work with fire departments, plan checkers, and building inspectors to ensure driveway requirements are being met.
- A standardized "Defensible Space Assessment" outlining mitigation measures should be required for individual subdivision lots.
- Adopt a standard to create a minimum setback of five feet and/or ten feet separation between dwellings or provide other alternative mitigation measures.
- Work with water purveyors to assure that the required fire flow of 1,500 gpm is provided to all single and two family dwellings.

Section 7.4 Mitigation measure 4

Create a Mechanism for the Oversight and Management of the Big Bear Valley Wildfire Protection Plan

Some possibilities for accomplishing this duty may include: continued oversight through the Fire Safe Council, fire departments, and City/County Planning Commissions.

Some of the oversight functions may include, but not be limited to:

- Administering a sustained public education strategy.
- Administration and follow-up on grant applications.
- Coordination between City/County/fire departments.
- A contact point for coordination with federal agencies.
- Tracking of equipment and training needs.
- Administering/coordinating post fire rehabilitation efforts such as damage assessment, erosion control, reseeding, weed control, etc.

Section 7.5 Mitigation measure 5

- Ensure the long-term economic stability of the communities by reducing the fire threat from very high to moderate/low.

Section 7.6 Mitigation measure 6

- Identify forestlands, private and public, developed and otherwise that, if treated, would reduce the potential impact to existing communities and structures in and around the Big Bear Valley. This is commonly referred to as the Wildland Urban Interface Zone.

Section 7.7 Mitigation measure 7

Continue Long-Range Strategic Planning to Anticipate and Prepare for Future Emergency Preparedness Needs

- Seek out and plan for funding the construction of a dedicated emergency operations center for use in emergencies.
- Seek out and plan funding for an emergency operations center manager/coordinator with job duties to promote and train Certified Emergency Response Teams (CERT) volunteers.
- A part of preparing for an emergency is to ensure that equipment is reliable. In accordance with NFPA 1901, replace all first run equipment that was manufactured prior to 1979.
- Work with local public works departments to identify roads that are deficient. Adopt a plan to modify and upgrade roads where practical.
- As part of the fire safety inspector program, identify propane tanks that do not have hold-downs. Enforce existing standards on all propane tanks in the WUI.
- When funding is available, provide a least two separate and dedicated dispatch circuits in compliance with NFPA 1221.

Section 7.8 Mitigation measure 8

- Continue the annual fuel reduction measures on private properties within the Big Bear Valley.
- Implement fuel reduction measures to assure continuing and ongoing safety of the Big Bear Valley watershed and recharge aquifers. Monitor the progress of watershed change over a period of time.
- Seek sources to assist in funding a fire safety inspector program to conduct ongoing implementation of the Public Resource Code, NFPA 1144, street and address standards and defensible space guidelines.

Section 7.9 Mitigation measure 9

- Identify high valued areas that, if absent from trees, would have a detrimental effect on the appearance and ambiance of the communities of the Big Bear Valley WUI. Propose and implement measures to assure the long-term survivability of these areas.

Section 7.10 Mitigation measure 10

- Work with timber harvesters and environmental groups to identify and support new markets that collectively, with public and private partnerships, assure that the forest vegetation and trees that are removed go to sources that have a beneficial use, i.e., lumber, biomass chips for landscaping & erosion control, and/or energy.

Section 7.11 Mitigation measure 11

- Work with the United States Forest Service annually to seek appropriate funding to complete fuel treatment programs on public lands.
- Incorporate as much as possible a "do more with less" concept by privatizing "off budget" management and treatment prescriptions of the forest.

Section 7.12 Mitigation measure 12

- Implement measures within Big Bear Valley Wildland Urban Interface restoring the forest to a condition resembling historic levels of fire regimes, species composition, and insects & disease agents while at the same time assure the removal of dead, dying or diseased trees. Reduce the tree density by removing over-dense trees of any size and the vegetation undergrowth that is necessary to achieve and maintain fire intensity at moderate to low levels.
- Collaborate with the United States Forest Service to ensure the development of the shaded fuel breaks are completed around all the communities of the Big Bear Valley.

Section 7.13 Mitigation measure 13

- Support the reintroduction of prescriptive and controlled fire into the ecosystem of the BBVWUI on both public and private lands.

SECTION 8.0 MANAGEMENT UNIT IDENTIFICATION

See Map 2.2.2 Management Unit Map.

MANAGEMENT UNIT 1 (BALDWIN LAKE AREA, INCLUDES LAKE WILLIAMS AND ERWIN LAKE)*

Fuel Type in Acres				Threat Level	Fire Regime I,III,IV	Condition Class 1/2/3/9 % by Acres
Grass Types 1-3	Chaparral Types 4-7	Timber Types 8-10	Slash Types 11-13	Extreme		
2882.81	3814.08	806.16			I/III**	3/50/26/19

***Fire Regime Condition Class and Threat Level, information provided by the California Department of Forestry, Fire Resource and Assistance Program (FRAP). The threat level was determined from the "Threat to People" 2003 Map. Discussions of the appropriate use of this map were inconclusive and therefore its use was included.**

**** Less than 2% of the acreage in this management unit consists of barren, water or urban lands.**

- **Fuel Type** – Juniper and pinion woodland with sagebrush, rabbit brush, and cheat grass understory.
- **Treatment** – On public lands, the USFS will identify appropriate prescription to be conducted and collaborate with local government and the public to ensure the ongoing objects of this Plan and healthy forest initiative are met. Prescribed fire possible. On private properties, owners and the agency having jurisdiction will ensure the ongoing implementation of fuel reduction meets appropriate state, county, and local requirements.
- **Who will accomplish work?** – Natural Resource Conservation Service, San Bernardino County Code Enforcement (Weed Abatement), San Bernardino County Fire Department, San Bernardino County Public Works Department, homeowners, Big Bear Lake Fire Department, Big Bear City Fire Department, and USFS.

Management Unit 2 (Lone Valley)*

Fuel Type in Acres				Threat Level	Fire Regime I,III,IV	Condition Class 1/2/3/9 % by Acres
Grass Types 1-3	Chaparral Types 4-7	Timber Types 8-10	Slash Types 11-13	Extreme to Very High		
3289.99	15565.34	2383.58			I/III/IV**	12/34/10/44

***Fire Regime Condition Class and Threat Level, information provided by the California Department of Forestry, Fire Resource and Assistance Program (FRAP). The threat level was determined from the "Threat to People" 2003 Map. Discussions of the appropriate use of this map were inconclusive and therefore its use was included.**

****Less than 1.0% of the acreage in this management unit consists of water, urban or barren lands.**

- **Fuel Type** –Predominate pinion woodland with sagebrush, rabbit brush, and cheat grass understory.
- **Treatment** – On public lands, the USFS will identify appropriate prescription to be conducted and collaborate with local government and the public to ensure the ongoing objects of this Plan and healthy forest initiative are met. Prescribed fire possible. On private properties, owners and the agency having jurisdiction will ensure the ongoing implementation of fuel reduction meets appropriate state, county, and local requirements.
- **Who will accomplish work?** – Natural Resource Conservation Service, San Bernardino County Code Enforcement (Weed Abatement), San Bernardino County Fire Department and San Bernardino County Public Works Department, homeowners, Big Bear Lake Fire Department, Big Bear City Fire Department, and USFS.

Management Unit 3 (Sugarloaf)*

Fuel Type in Acres				Threat Level	Fire Regime I,III,IV	Condition Class 1/2/3/9 % by Acres
Grass Types 1-3	Chaparral Types 4-7	Timber Types 8-10	Slash Types 11-13	Extreme to Very High		
88.85	228.54	7979.10			I/III**	15/41/29/15

***Fire Regime Condition Class and Threat Level, information provided by the California Department of Forestry, Fire Resource and Assistance Program (FRAP). The threat level was determined from the "Threat to People" 2003 Map. Discussions of the appropriate use of this map were inconclusive and therefore its use was included.**

****Less than 5.0 % of the acreage in this management unit consists of water or barren lands; 14.8% is urbanized.**

- **Fuel Type** – Pinion, Jeffery pine, manzanita, cheat grass understory.
- **Treatment** - On public lands, the USFS will identify appropriate prescription to be conducted and collaborate with local government and the public to ensure the ongoing objects of this Plan and healthy forest initiative are met. Prescribed fire possible. On private properties, owners and the agency having jurisdiction will ensure the ongoing implementation of fuel reduction meets appropriate state, county, and local requirements.
- **Who will accomplish work?** - Natural Resource Conservation Service, San Bernardino County Code Enforcement (Weed Abatement), San Bernardino County Fire Department and San Bernardino County Public Works Department, homeowners, Big Bear Lake Fire Department, Big Bear City Fire Department, and USFS.

Management Unit 4 (Moonridge)*

Fuel Type in Acres				Threat Level	Fire Regime I,III,IV	Condition Class 1/2/3/9 % by Acres
Grass Types 1-3	Chaparral Types 4-7	Timber Types 8-10	Slash Types 11-13	Extreme to Very High		
166.94	215.67	5928.09			I/III**	12/8/42/38

***Fire Regime Condition Class and Threat Level, information provided by the California Department of Forestry, Fire Resource and Assistance Program (FRAP). The threat level was determined from the "Threat to People" 2003 Map. Discussions of the appropriate use of this map were inconclusive and therefore its use was included.**

****Less than 2.0 % of the acreage in this management unit consists of barren or water lands; 35% is urbanized.**

- **Fuel Type** – Dense mixed conifer dominated by white fir, Jeffrey pine, and oak with a build up of ground litter and an array of various shrubs. Significant mortality of white fir and lesser mortality of Jeffrey pine.
- **Treatment** – On public lands, the USFS will identify appropriate prescription to be conducted and collaborate with local government and the public to ensure the ongoing objects of this Plan and healthy forest initiative are met. Prescribed fire possible. On private properties, owners and the agency having jurisdiction will ensure the ongoing implementation of fuel reduction meets appropriate state, county, and local requirements.
- **Who will accomplish work?** – Natural Resource Conservation Service, San Bernardino County Code Enforcement (Weed Abatement), San Bernardino County Fire Department and San Bernardino County Public Works Department, homeowners, Big Bear Lake Fire Department, Big Bear City Fire Department, and USFS.

Management Unit 5 (Big Bear City Highway 18 to WUI boundary)*

Fuel Type in Acres				Threat Level	Fire Regime I,III,IV	Condition Class 1/2/3/9 % by Acres
Grass Types 1-3	Chaparral Types 4-7	Timber Types 8-10	Slash Types 11-13	Extreme to Very High		
322.18	0.00	1641.95			I/III**	12/34/10/44

***Fire Regime Condition Class and Threat Level, information provided by the California Department of Forestry, Fire Resource and Assistance Program (FRAP). The threat level was determined from the "Threat to People" 2003 Map. Discussions of the appropriate use of this map were inconclusive and therefore its use was included.**

****Less than 3.8% of the acreage in this management unit consists of barren and water lands; 41% is considered urban.**

- **Fuel Type** – western juniper, Jeffery Pine, hardwood, woodland with sagebrush, manzanita, rabbit brush, and cheat grass understory.
- **Treatment** - On public lands, the USFS will identify appropriate prescription to be conducted and collaborate with local government and the public to ensure the ongoing objects of this Plan and healthy forest initiative are met. Prescribed fire possible. On private properties, owners and the agency having jurisdiction will ensure the ongoing implementation of fuel reduction meets appropriate state, county, and local requirements.
- **Who will accomplish work?** - Natural Resource Conservation Service, San Bernardino County Code Enforcement (Weed Abatement), San Bernardino County Fire Department and San Bernardino County Public Works Department,

homeowners, Big Bear Lake Fire Department, Big Bear City Fire Department, and USFS.

Management Unit 6 (Big Bear Lake)*

Fuel Type in Acres				Threat Level	Fire Regime I,III,IV	Condition Class 1/2/3/9 % by Acres
Grass Types 1-3	Chaparral Types 4-7	Timber Types 8-10	Slash Types 11-13	Moderate to Extreme		
51.10	346.11	2733.05			I/III**	6/7/60/27

***Fire Regime Condition Class and Threat Level, information provided by the California Department of Forestry, Fire Resource and Assistance Program (FRAP). The threat level was determined from the "Threat to People" 2003 Map. Discussions of the appropriate use of this map were inconclusive and therefore its use was included.**

****Less than 2.4% of the acreage in this management unit is water; 24% is considered urban.**

- **Fuel Type** – Moderate mixed conifer and hardwood (Jeffrey pine, white fir, and oak) with a moderate array of various shrubs. Areas with heavy surface litter
- **Treatment** – On public lands, the USFS will identify appropriate prescription to be conducted and collaborate with local government and the public to ensure the ongoing objects of this Plan and healthy forest initiative are met. Prescribed fire possible. On private properties, owners and the agency having jurisdiction will ensure the ongoing implementation of fuel reduction meets appropriate state, county, and local requirements.
- **Who will accomplish work?** – Natural Resource Conservation Service, San Bernardino County Code Enforcement (Weed Abatement), San Bernardino County Fire Department and San Bernardino County Public Works Department, homeowners, Big Bear Lake Fire Department, Big Bear City Fire Department, and USFS.

Management Unit 7 (North Boundary South to Fawnskin)*

Fuel Type in Acres				Threat Level	Fire Regime I,III,IV	Condition Class 1/2/3/9 % by Acres
Grass Types 1-3	Chaparral Types 4-7	Timber Types 8-10	Slash Types 11-13	Very High to Extreme		
108.15	401.00	5649.90			I/III**	11/54/31/5

***Fire Regime Condition Class and Threat Level, information provided by the California Department of Forestry, Fire Resource and Assistance Program (FRAP). The threat level was determined from the "Threat to People" 2003 Map. Discussions of the appropriate use of this map were inconclusive and therefore its use was included.**

****Less than 5.0 % of the acreage in this management unit consists of barren urban or water lands.**

- **Fuel Type** – moderate mixed conifer and hardwood (Jeffrey pine, western juniper, and oak) with a moderate array of various shrubs. Areas with heavy surface litter.
- **Treatment** – On public lands, the USFS will identify appropriate prescription to be conducted and collaborate with local government and the public to ensure the ongoing objects of this Plan and healthy forest initiative are met. Prescribed fire possible. On private properties, owners and the agency having jurisdiction will ensure the ongoing implementation of fuel reduction meets appropriate state, county, and local requirements.
- **Who will accomplish work?** – Natural Resource Conservation Service, San Bernardino County Code Enforcement (Weed Abatement), San Bernardino County Fire Department and San Bernardino County Public Works Department, homeowners, Big Bear Lake Fire Department, Big Bear City Fire Department, and USFS.

Management Unit 8 (USFS Lease Land) Gray's Peak (Fawnskin to Dam)*

Fuel Type in Acres				Threat Level	Fire Regime I,III,IV	Condition Class 1/2/3/9 % by Acres
Grass Types 1-3	Chaparral Types 4-7	Timber Types 8-10	Slash Types 11-13	Extreme		
24.00	917.50	3623.22			I/III**	13/11/72/4

***Fire Regime Condition Class and Threat Level, information provided by the California Department of Forestry, Fire Resource and Assistance Program (FRAP). The threat level was determined from the "Threat to People" 2003 Map. Discussions of the appropriate use of this map were inconclusive and therefore its use was included.**

****Less than 3.3 % of the acreage in this management unit consists of barren urban or water lands.**

- **Fuel Type** – moderate mixed conifer and hardwood (Jeffrey pine, white fir and oak) with a heavy array of various shrubs. Areas with moderate surface litter.
- **Treatment** – On public lands, the USFS will identify appropriate prescription to be conducted and collaborate with local government and the public to ensure the ongoing objectives of this Plan and healthy forest initiative are met. Prescribed fire possible. On private properties, owners and the agency having jurisdiction will ensure the ongoing implementation of fuel reduction meets appropriate state, county, and local requirements.
- **Who will accomplish work?** – Natural Resource Conservation Service, San Bernardino County Code Enforcement (Weed Abatement), San Bernardino County Fire Department and San Bernardino County Public Works Department, homeowners, Big Bear Lake Fire Department, Big Bear City Fire Department, and USFS.

MANAGEMENT UNIT 9 (MILL CREEK)*

Fuel Type in Acres				Threat Level	Fire Regime I,III,IV	Condition Class 1/2/3/9 % by Acres
Grass Types 1-3	Chaparral Types 4-7	Timber Types 8-10	Slash Types 11-13	Extreme		
76.66	2275.55	5776.88			I/III**	19/24/55/2

***Fire Regime Condition Class and Threat Level, information provided by the California Department of Forestry, Fire Resource and Assistance Program (FRAP). The threat level was determined from the "Threat to People" 2003 Map. Discussions of the appropriate use of this map were inconclusive and therefore its use was included.**

****Less than 3.0 % of the acreage in this management unit consists of barren urban or water lands.**

- **Fuel Type** – moderate mixed conifer and hardwood (Jeffrey pine, sugar pine, lodgepole pine, white fir, and oak) with a moderate array of various shrubs. Areas with heavy surface litter.
- **Treatment** – On public lands, the USFS will identify appropriate prescription to be conducted and collaborate with local government and the public to ensure the ongoing objects of this Plan and healthy forest initiative are met. Prescribed fire possible. On private properties, owners and the agency having jurisdiction will assure the ongoing implementation of fuel reduction meets appropriate state, county, and local requirements.
- **Who will accomplish work?** – Natural Resource Conservation Service, San Bernardino County Code Enforcement (Weed Abatement), San Bernardino County Fire Department and San Bernardino County Public Works Department, homeowners, Big Bear Lake Fire Department, Big Bear City Fire Department, and USFS.

Management Unit 10 (Holcomb)*

Fuel Type in Acres				Threat Level	Fire Regime I,III,IV	Condition Class 1/2/3/9 % by Acres
Grass Types 1-3	Chaparral Types 4-7	Timber Types 8-10	Slash Types 11-13	Very High to Extreme		
20,694	8,370	5,777			I/III**	12/56/30/2

***Fire Regime Condition Class and Threat Level, information provided by the California Department of Forestry, Fire Resource and Assistance Program (FRAP). The threat level was determined from the "Threat to People" 2003 Map. Discussions of the appropriate use of this map were inconclusive and therefore its use was included.**

****Less than 1.8 % of the acreage in this management unit consists of water, barren or urban lands.**

- **Fuel Type** – moderate mixed conifer and hardwood (Jeffrey pine, western juniper, pinion, and oak) with a moderate array of various shrubs. Areas with moderate surface litter.
- **Treatment** – On public lands, the USFS will identify appropriate prescription to be conducted and collaborate with local government and the public to ensure the ongoing objects of this Plan and healthy forest initiative are met. Prescribed fire possible. On private properties, owners and the agency having jurisdiction will ensure the ongoing implementation of fuel reduction meets appropriate state, county, and local requirements.
- **Who will accomplish work?** – Natural Resource Conservation Service, San Bernardino County Code Enforcement (Weed Abatement), San Bernardino County Fire Department and San Bernardino County Public Works Department, homeowners, Big Bear Lake Fire Department, Big Bear City Fire Department, and USFS.

MANAGEMENT UNIT 11 (SANTA ANA/SOUTHSIDE)*

Fuel Type in Acres				Threat Level	Fire Regime I,III,IV	Condition Class 1/2/3/9 % by Acres
Grass Types 1-3	Chaparral Types 4-7	Timber Types 8-10	Slash Types 11-13	Very High to Extreme		
2015.75	12763.11	25908.52			I/III**	18/44/37/1

***Fire Regime Condition Class and Threat Level, information provided by the California Department of Forestry, Fire Resource and Assistance Program (FRAP). The threat level was determined from the "Threat to People" 2003 Map. Discussions of the appropriate use of this map were inconclusive and therefore its use was included.**

****Less than 3.0 % of the acreage in this management unit consists of water, agriculture, barren or urban lands.**

- **Fuel Type** – moderate mixed conifer and hardwood (Jeffrey pine, white fir, and cedar hardwood) with a moderate array of various shrubs, manzanita, and willow bushes. Areas with heavy surface litter.
- **Treatment** – On public lands, the USFS will identify appropriate prescription to be conducted and collaborate with local government and the public to ensure the ongoing objects of this Plan and healthy forest initiative are met. Prescribed fire possible. On private properties, owners and the agency having jurisdiction will ensure the ongoing implementation of fuel reduction meets appropriate state, county, and local requirements.
- **Who will accomplish work?** – Natural Resource Conservation Service, San Bernardino County Code Enforcement (Weed Abatement), San Bernardino County Fire Department and San Bernardino County Public Works Department, homeowners, Big Bear Lake Fire Department, Big Bear City Fire Department, and USFS.

Appendixes

Appendix A
Big Bear Valley Wildland Urban Interface - Fuel Types Acreage

		Fuel Type 1	Fuel Type 2	Fuel Type 4	Fuel Type 5	Fuel Type 6	Fuel Type 8	Fuel Type 9	Fuel Type 10	Fuel Type 15	Fuel Type 97	Fuel Type 98	Fuel Type 99	
Mgmt. Unit No.	Big Bear Valley Wildland Urban Interface Mgmt. Units	Grass Group	Grass Under Story Open Pine	Shrub Group	Medium Brush	Pinion Juniper Sage	Timber Medium Conifer	Long Needle Conifer Hard Wood	Timber Heavy Dead Forest Litter	Desert	Agri-culture	Water	Barren	Total Acreage Per Manage-ment Unit
1	Baldwin Lk/ Erwin Lk	236.88	2645.93	392.56	3421.53	0.00	3.68	802.49	0.00	0.00	140.83	1023.52	204.58	**8872.00**
2	Lone Valley	0.00	3289.99	2174.44	13378.45	12.45	4.39	2379.19	0.00	5910.80	0.00	4.91	61.33	**27215.95**
3	Sugarloaf	43.33	45.52	219.70	1.06	7.78	18.10	7960.99	0.00	0.00	37.61	11.51	150.44	**8496.04**
4	Moonridge	108.00	0.00	210.38	30.67	20.40	0.00	5928.09	0.00	0.00	744.32	50.14	125.92	**7217.92**
5	Big Bear City	78.22	243.96	696.95	0.00	0.00	0.00	1641.94	0.00	0.00	194.88	31.81	100.77	**2988.53**
6	Big Bear Lake	42.21	8.89	246.70	46.97	52.44	0.00	2733.06	0.00	0.00	81.61	47.13	39.75	**3298.76**
7	Fawnskin	0.00	108.15	388.55	0.00	12.45	44.24	5605.67	0.00	0.00	37.91	6.15	49.81	**6252.93**
8	Gray's Peak	11.55	12.45	181.97	303.53	432.00	3.06	3620.17	0.00	0.00	23.33	10.61	29.38	**4628.05**
9	Millcreek	50.00	26.66	365.14	1865.31	45.10	33.82	5681.04	62.02	0.00	0.00	29.11	174.88	**8333.08**
10	Holcomb	1357.27	19336.96	5963.05	2146.22	260.48	8.23	17879.15	0.00	4036.37	0.00	20.45	800.01	**51808.19**
11	Santa Ana	236.22	1779.53	10639.78	1926.76	196.56	393.02	24318.49	1197.01	154.56	0.00	39.40	454.56	**41335.89**
	Total Acres	**2163.68**	**27498.04**	**21479.22**	**23120.50**	**1039.66**	**508.54**	**78550.28**	**1259.03**	**10101.73**	**1260.49**	**1274.74**	**2191.43**	**170447.34**

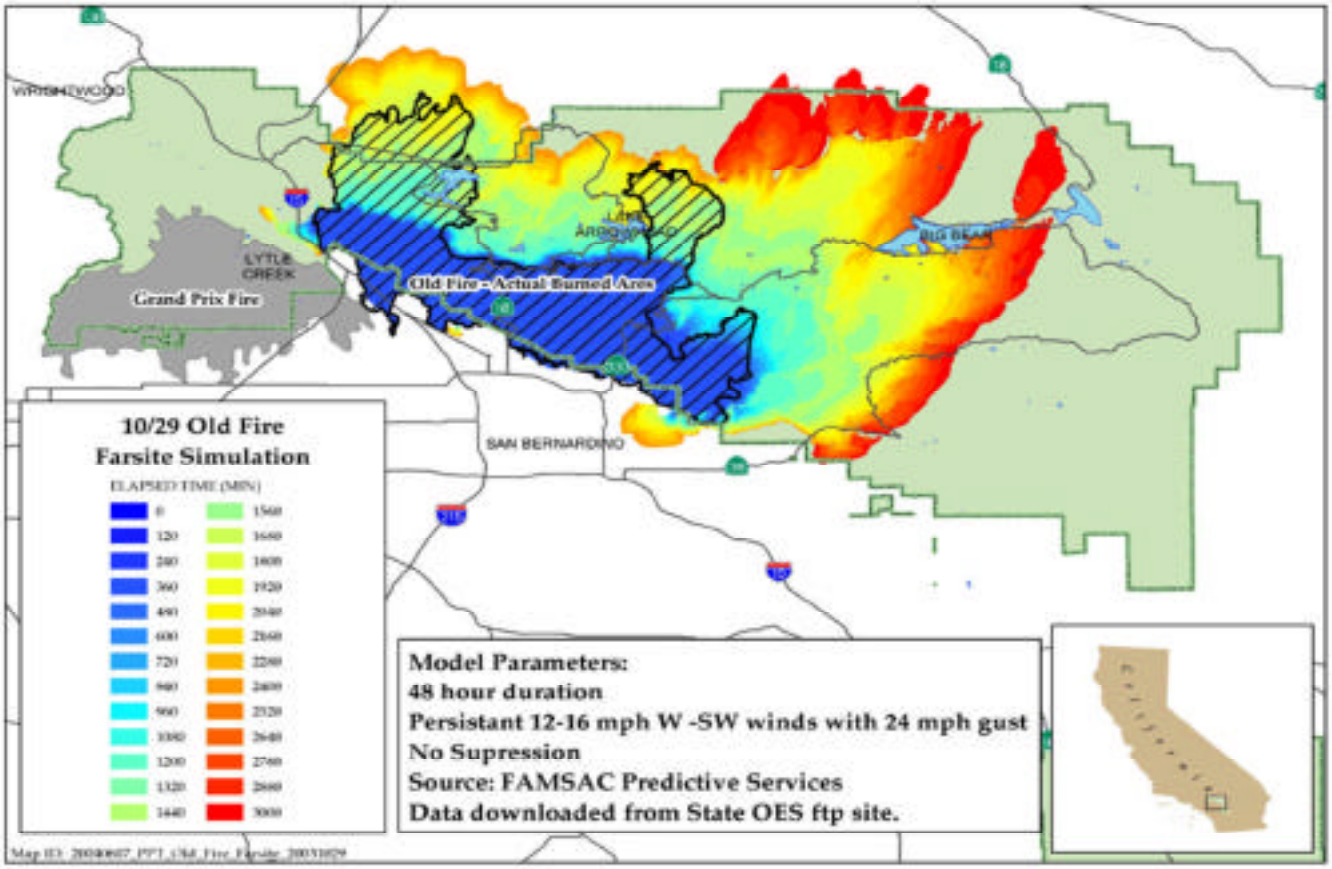
Appendix B
Big Bear Valley Wildland Urban Interface - Fuel Types Acreage by Private and Forest Lands

		Fuel Type 1	Fuel Type 2	Fuel Type 4	Fuel Type 5	Fuel Type 6	Fuel Type 8	Fuel Type 9	Fuel Type 10	Fuel Type 15	Fuel Type 97	Fuel Type 98	Fuel Type 99	
Manage-ment Unit No.	Big Bear Valley Wildland Urban Interface Management Units	Grass Group	Grass Under Story Open Pine	Shrub Group	Medium Brush	Pinion Juniper Sage	Timber Medium Conifer	Long Needle Conifer Hardwood	Timber Heavy Dead Forest Litter	Desert	Agri-culture	Water	Barren	Total Acreage Per Manage-ment Unit
1	Baldwin Lake / Erwin Lake	236.88	2645.93	392.56	3421.53	0.00	3.68	802.49	0.00	0.00	140.83	1023.52	204.58	8872.00
	Forest Land	17.92	826.01	133.53	2783.23		3.15	323.23			1.02	641.11	6.48	
	Private Land	218.96	1819.92	259.02	638.30		0.52	479.26			139.81	382.41	198.10	
		Grass Types 1 - 3			Chaparral Types 4 - 7			Timber Types 8 - 10						
		2882.81			3814.08			806.16						
2	Lone Valley	0.00	3289.99	2174.44	13378.45	12.45	4.39	2379.19	0.00	5910.80	0.00	4.91	61.33	27215.95
	Forest Land		3161.40	1747.61	12694.80	0.67	3.13	1336.43		4851.57		4.91	52.89	
	Private Land		128.59	426.83	683.65	11.78	1.26	1042.76		1059.23		0.00	8.43	
		Grass Types 1 - 3			Chaparral Types 4 - 7			Timber Types 8 - 10						
		3289.99			15565.34			2383.58						
3	Sugarloaf	43.33	45.52	219.70	1.06	7.78	18.10	7960.99	0.00	0.00	37.61	11.51	150.44	8496.04
	Forest Land	8.89	9.85	133.20	1.06	0.11	14.70	5549.20			37.61	7.03	93.33	
	Private Land	34.44	35.67	86.50	0.00	7.67	3.41	2411.79			0.00	4.48	57.12	
		Grass Types 1 - 3			Chaparral Types 4 - 7			Timber Types 8 - 10						
		88.85			228.54			7979.10						
4	Moonridge	108.00	0.00	210.38	30.67	20.40	0.00	5928.09	0.00	0.00	744.32	50.14	125.92	7217.92
	Forest Land	0.00		151.44	30.67	7.24	0.00	3727.34			276.02	0.46	20.75	
	Private Land	108.00	58.94	0.00	13.16	13.16		2200.75			468.29	49.68	105.17	
		Grass Types 1 - 3			Chaparral Types 4 - 7			Timber Types 8 - 10						
		166.94			215.67			5928.09						
5	Big Bear City	78.22	243.96	696.95	0.00	0.00	0.00	1641.94	0.00	0.00	194.88	31.81	100.77	2988.53
	Forest Land	0.00	110.80	643.23	0.00			519.93			0.00	3.31	24.71	
	Private Land	78.22	133.16	53.72				1122.02			194.88	28.50	76.05	
		Grass Types 1- 3			Chaparral Types 4 - 7			Timber Types 8 - 10						
		322.18			0.00			1641.95						
6	Big Bear Lake	42.21	8.89	246.70	46.97	52.44	0.00	2733.06	0.00	0.00	81.61	47.13	39.75	3298.76
	Forest Land	0.96	8.89	246.70	46.97	39.50		1639.63			0.17	0.00	0.00	
	Private Land	41.25	0.00	0.00	0.00	12.94		1093.42			81.44	47.13	39.75	
		Grass Types 1 - 3			Chaparral Types 4 - 7			Timber Types 8 - 10						
		51.10			346.11			2733.05						

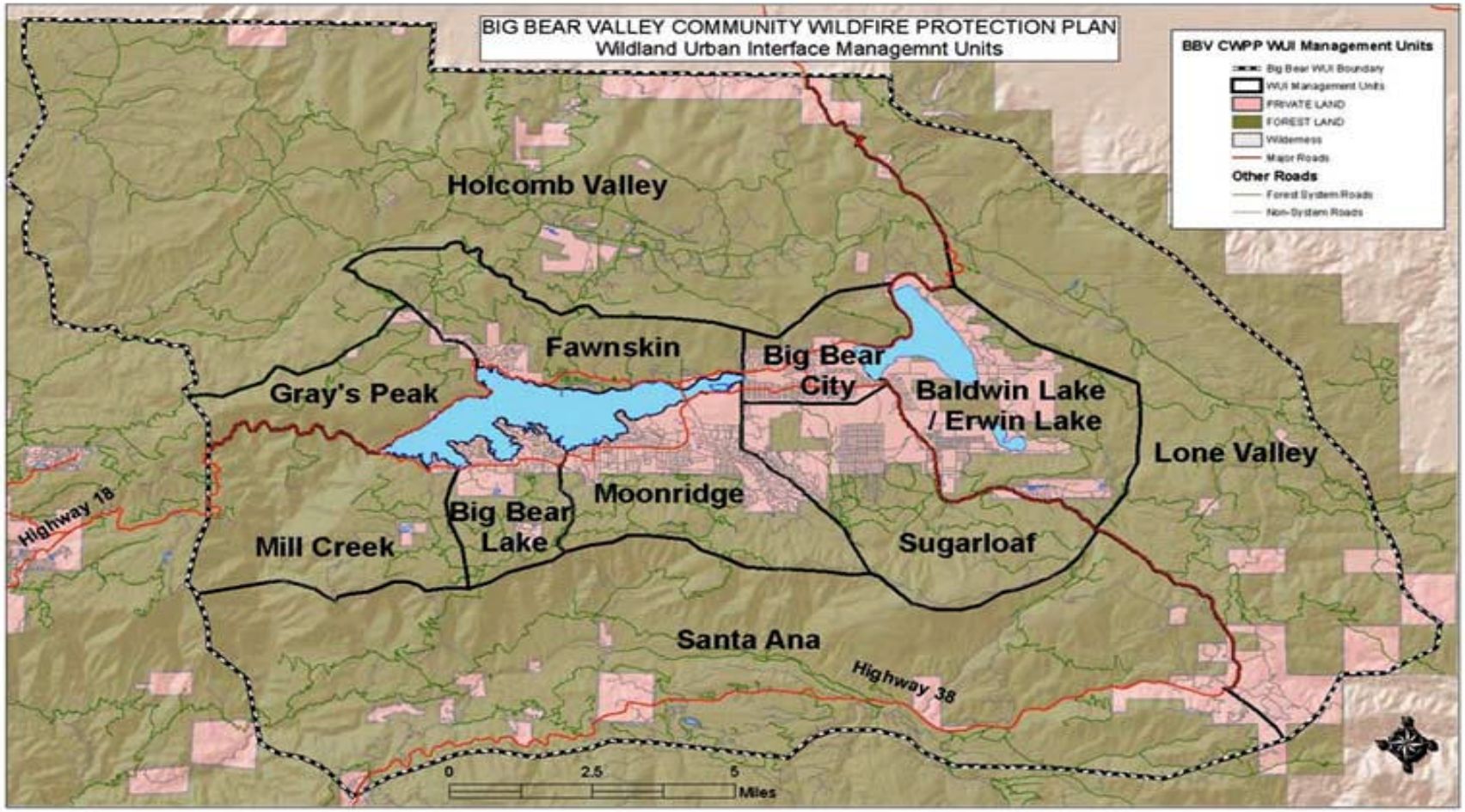
Appendix B
Big Bear Valley Wildland Urban Interface - Fuel Types Acreage by Private and Forest Lands

		Fuel Type 1	Fuel Type 2	Fuel Type 4	Fuel Type 5	Fuel Type 6	Fuel Type 8	Fuel Type 9	Fuel Type 10	Fuel Type 15	Fuel Type 97	Fuel Type 98	Fuel Type 99	
Manage-ment Unit No.	Big Bear Valley Wildland Urban Interface Management Units	Grass Group	Grass Under Story Open Pine	Shrub Group	Medium Brush	Pinion Juniper Sage	Timber Medium Conifer	Long Needle Conifer Hardwood	Timber Heavy Dead Forest Litter	Desert	Agri-culture	Water	Barren	Total Acreage Per Manage-ment Unit
7	Fawnskin	0.00	108.15	388.55	0.00	12.45	44.24	5605.67	0.00	0.00	37.91	6.15	49.81	6252.93
	Forest Land		76.78	388.18		12.45	28.64	4978.55			11.82	3.03	38.11	
	Private Land		31.37	0.37		0.00	15.60	627.11			26.09	3.13	11.70	
		Grass Types 1 - 3			Chaparral Types 4 - 7			Timber Types 8 - 10						
		108.15			401.00			5649.90						
8	Gray's Peak	11.55	12.45	181.97	303.53	432.00	3.06	3620.17	0.00	0.00	23.33	10.61	29.38	4628.05
	Forest Land	2.22	12.45	180.23	303.53	427.48	1.28	3397.56			3.78	8.15	17.42	
	Private Land	9.33	0.00	1.74	0.00	4.52	1.77	222.61			19.55	2.47	11.97	
		Grass Types 1 - 3			Chaparral Types 4 - 7			Timber Types 8 - 10						
		24.00			917.50			3623.22						
9	Millcreek	50.00	26.66	365.14	1865.31	45.10	33.82	5681.04	62.02	0.00	0.00	29.11	174.88	8333.08
	Forest Land	25.32	26.66	365.14	1865.31	45.10	33.82	5537.11	62.02			15.82	161.73	
	Private Land	24.68	0.00	0.00	0.00	0.00	0.00	143.93	0.00			13.29	13.15	
		Grass Types 1 - 3			Chaparral Types 4 - 7			Timber Types 8 - 10						
		76.66			2275.55			5776.88						
10	Holcomb	1357.27	19336.96	5963.05	2146.22	260.48	8.23	17879.15	0.00	4036.37	0.00	20.45	800.01	51808.19
	Forest Land													
	Private Lane													
		Grass Types 1 - 3			Chaparral Types 4 - 7			Timber Types 8 - 10						
11	Santa Ana	236.22	1779.53	10639.78	1926.76	196.56	393.02	24318.49	1197.01	154.56	0.00	39.40	454.56	41335.89
	Forest Land	192.22	1733.07	10374.31	1838.45	175.51	325.10	21908.50	1153.36	148.03	0.00	36.06	429.91	
	Private Land	44.00	46.46	265.48	88.31	21.05	67.91	2409.99	43.66	6.53	0.00	98.34	24.66	
		Grass Types 1 - 3			Chaparral Types 4 - 7			Timber Types 8 - 10						
		2015.75			12763.11			25908.52						
	Total Acres													170447.34

Appendix C
Big Bear Valley Wildland Urban Interface Boundary



Appendix D
Wildland Urban Interface Management Units



Bibliography

A.
Agee, James K, Skinner, Carl N, "Basic Principles of Forest Fuel Reduction Treatments", *Forest Ecology and Management 211* (2005) 83-96

B.
Barley, Dunn, "Managing for Forest Health and Sustainability", unpublished

Big Bear City Community Services District, Ordinance No. 212, October 2002

C.
California Department of Finance, "City Population and Housing Estimates", January 1, 2004

California Department of Forestry FRAP, "Characterizing the Fire Threat to Wildland-Urban Interface Areas in California"

California Fire Alliance and Fire Safe Council, "Abridged Community Fire Plan Template Outline", August 2004 Edition

California, State of, "Public Resources Code", 1987 Edition

City of Big Bear Lake, "Residential Development Standards, Setback Standards", September 2003

City of Big Bear Lake, "Tree Conservation Ordinance", Adopted October 2002

Cohen, Jake D. "Preventing Disaster", Journal of Forestry, unknown date of publication

County of San Bernardino, Auditor- Controller Property Tax Division, July 2005

County of San Bernardino, "Fire Safety Overlay District", Ordinance 3341, amended June 2004

County of San Bernardino "Operational Area Multi-Jurisdictional Hazard Mitigation Plan", March 2005

D.
Defensible Space Landscaping in the Urban/Wildland Interface, www.ucfpl.edc/I-Zone

E.
Economics & Politics, Inc., "Big Bear Area's Economic Performance", February 2002

Environmental Data Service, 1968 "Climatic Atlas of the United States", USDC, Environmental Service Administration

Ernst, W.G., 1981 edition, "The Geotectonic Development of California", Prentice-Hall, Englewood Cliffs, N.J.

F.
Fenneman, N.M., (with collaboration of D.W. Johnson), 1946, "Physiographic Divisions of the United States", Washington, DC, U.S. Department of Interior, Geological Survey, (map), scale 1: 7,000,000 colored

G.
Glossary of Soil Science Terms, 1987, "Soil Science Society of America", Madison, Wisconsin

Goodridge, J.D., 1981, "California Rainfall Summary - Monthly Precipitation", 1849-1980, California Department of Water Resources, Sacramento

Goudey, C.B. and D. W. Smith, 1994 edition, "Ecological Units of California Subsections" (map) San Francisco, CA. U.S. Department of Agriculture, Forest Service, scale: 1,000,000, colored

H.
Haskins, D.M., and J.M. Chatoian, 1993, "Geology Data Standards for Ecological Unit Inventories for the Pacific Southwest Region", San Francisco, CA. U.S. Department of Agriculture, Forest Service, R5 Tech. Paper 05-008

"Hierarchy of Ecoregions at a Range of Scales" (map), Robert G. Bailey, cartog, 1994, Washington, DC. U.S. Department of Agriculture, Forest Service. 7 x 7.5 inches

Holdridge, L.R., 1967, "Life Zone Ecology", San Jose, Costa Rica, Tropical Science Center, 206 p.

I.
Insurance Services Office 2005, "Guide for Determining Fire Flow"

Insurance Services Office, Inc. Public Protection Classifications Improvement Statements for Big Bear Lake Fire Department, San Bernardino County, CA, November 2000

J.
Jennings, C.W., 1994, "Fault Activity Map of California and Adjacent Areas", Geologic Data Map No. 6, scale1: 750,000. California Division of Mines & Geology, Sacramento. CA

K.
Küchler, A.W., 1970, "Potential Natural Vegetation" (map). Repr. in the National Atlas of the United States, Washington, DC, U.S. Department of Interior, Geological Survey, scale 1:7,500,000; colored

Küchler, A.W., 1977, "Natural Vegetation of California" (map), Department of Geography, University of Kansas, scale 1:1,000,000; colored

M.
McNab, W.H., and P.E. Avers, editors, 1994, "Ecological Sub-Regions of the United States: Section Descriptions", Washington, DC, U.S. Department of Agriculture, Forest Service, Publication WO-WSA-5

Mountain Area Safety Taskforce, "Fire Safety & Prevention Guide", 2004

Mountain Area Safety Taskforce, "Mast Area of Infestation Statistics", revised July 2003

N.
National Fire Protection Association, Standard 1141, "Fire Protection of Planned Building Groups", 2003 Edition

National Fire Protection Association, Standard 1142, "Water Supplies for Suburban and Rural Fire Fighting", 2001 Edition

National Fire Protection Association, Standard 1144, "Protection of Life and Property from Wildfire", 2002 Edition

National Fire Protection Association, Standard 1221, "Installation, Maintenance, and Use of Emergency Services Communications Systems", 2002 Edition

P.
Prescott Area Wildland / Urban Interface Commission, "Wildfire Protection Plan", March 2005
FAMSAC Predictive Services, Old Fire Farsite, Projected Fire Simulation, October 29, 2003

R.
Radbruch, D.H., and K.C. Crowther, 1973, "Map Showing Areas of Estimated Relative Amounts of Landslides in California", U.S. Department of Interior, Geological Survey, Miscellaneous Geological Investigations Map I-747

Rantz, S.E., 1972, "Runoff Characteristics of California Streams", U.S. Department of Interior, Geological Survey, Water Supply Paper 2009-A, 37 pages, map

Regelbrugge, John C., "Written Comments of the BBVCWPP, April 20, 2006"

S.
San Bernardino National Forest, "Campground Statistics", July 2001 Edition

Sawyer, J.O., and T. Keeler-Wolf, 1995, "A Manual of California Vegetation", Sacramento, CA, California Native Plant Society, 471 p.

Soil Survey Staff, 1992, "Keys to Soil Taxonomy", fifth edition, SMSS Technical Monograph No. 19, Blacksburg, VA, Pocahantas Press, Inc., 556 p.

Soil Survey Staff, 1994 and 1996, "Keys to Soil Taxonomy", Washington, DC, U.S. Department of Agriculture, Natural Resources Conservation Service, Seventh. Edition, 644 p.

State of California, Department of Fish and Game, January 2005, "State and Federally Listed Endangered and Threatened Animals of California"

T.
T.E.A.M.S. Enterprise Unit, "South Big Bear Fuels Reduction and Forest Health Report", January 15, 2005

T.E.A.M.S. Enterprise Unit, "Amended Treatment Level Guidelines ", October 12, 2005

TSS Consultants, "Southern California Biomass Disposal and Utilization Assessment", May 2005

U.
Unknown Author, "Fire and Fuels Buildup", date unknown

United States Department of Agriculture, White, Weise & Frommer, "Preliminary Evaluation of Flammability of Native and Ornamental Plants with the Cone Calorimeter"

United States Department of Agriculture, Forest Service, 1994, "Draft Forest Service Manual 2060, Ecosystem Classification, Interpretation, and Application", Pacific Southwest Region, San Francisco, CA

United States Department of Agriculture, Forest Service, 1994, "Draft Region 5 Ecosystem Management Guidebook", Pacific Southwest Region, San Francisco, CA., 3 volumes

United States Department of Agriculture, Forest Service, 1995, "Sustaining Ecosystems, A Conceptual Framework", Pacific Southwest Region, San Francisco. CA R5-EM-TP-001, April 1995

United States Department of Agriculture, "Aids to Determining Fuels Models for Estimating Fire Behavior", April 1982

United States Department of Agriculture, Forest Service and Soil Conservation Service, numerous published soil survey reports of national forests and counties in California

United States Department of Agriculture, Natural Resources Conservation Service (formally Soil Conservation Service), 1994, STATSGO, (maps) 1:250,000, (statewide maps and legends indicating predominate soils series in polygons)

United States Department of Agriculture, Natural Resources Conservation Service (formally Soil Conservation Service), 1995, "Classification of Soil Series" (family listing)

United States Department of Agriculture, Natural Resources Conservation Service (formally Soil Conservation Service), 1981, "Land Resource Regions and Major Land Resource Areas of the United States", *Agriculture Handbook* 296, scale 1:7,500,000; colored, 156 p.

United States Department of Agriculture, Natural Resources Conservation Service (formally Soil Conservation Service), 1981, "Land Resource Regions and Major Land Resource Areas of the United States", *Agriculture Handbook* 296, scale 1:1,000,000; colored, 156 p.

United States Department of Agriculture, *Federal Register,* August 17, 2004

United States Government Accountability Office, "Protecting Structures and Improving Communication During Wildland Fires", April 2005

United States Department of Agriculture, "Managing the Impact of Wildfires on Communities and the Environment", September 2000

United States Department of Agriculture, "America's Forests", 2003 *Health Update*

United States Department of Agriculture, "Environmental Assessment", *South Big Bear Fuels Reduction and Forest Health Project,* May 2005

United States Department of Agriculture, "Fire History of the San Bernardino National Forest for 104 years", August 2005

United States Department of Agriculture, "Soils Report" Peter Fahnestock, *Resource Soils Scientist*, Natural Resources Conservation Service

W.
Water Resources Division, 1969, "Mean Annual Precipitation in California", Menlo Park, CA, U.S. Department of Interior, Geological Survey

Western Fire Chiefs Association, International Conference of Building Officials, 2000 Edition amending the Uniform Fire Code

Wieslander, A.E., 1961, "California's Vegetation Maps in Recent Advances in Botany", *University Toronto Press*

Y.
Yegge David A, Interview with Battalion Chief George Corley, San Bernardino County Fire Department, September 2005

Yegge David A., Interview with Fire Chief Dana Van Leuven, Big Bear City Fire Department, September 20, 2005

Yegge David A., Interview with Fire Chief John D. Morley, Big Bear Lake Fire Department, August 2005

Yegge David A., Interview with Division Chief Jeff Willis, Big Bear City Fire Department, September 20, 2005 and November 2005

Z.
Zimmerman, Gene, Forest Supervisor, U.S. Forest Service, "Cost of 2003 Wildfires", *The Sun* Newspaper, August 5, 2005

Definitions

A.

accumulation - Any and all limbs, branches, prunings, trimmings, stumps, and parts of domestic, natural or cultivated organic material which has been cut, looped-off, separated or removed or fallen from such trees and have not been destroyed by burning or removal.

adaptive management - A type of natural resource management that implies making decisions as part of an ongoing process. Monitoring the results of actions will provide a flow of information that may indicate the need to change a course of action. Scientific findings and the needs of society may also indicate the need to adapt resource management to new information.

affected environment - The natural environment that exists at the present time in an area being analyzed.

age class - An age grouping of trees according to an interval of years, usually 20 years. A single age class would have trees that are within 20 years of the same age such as 1-20 years or 21-40 years.

aspect - The direction a slope faces. A hillside facing east has an eastern aspect.

aquifer - A body of rock that is saturated with water or transmits water. When people drill wells, they tap water contained within an aquifer.

B.

bark beetle - An insect that bores through the bark of forest trees to eat the inner bark and lay its eggs. Bark beetles are important killers of forest trees.

basal area - The area of the cross section of a tree trunk near its base, usually 4 and 1/2 feet above the ground. Basal area is a way to measure how much a site is occupied by trees. The term basal area is often used to describe the collective basal area of trees per acre.

Best Management Practices (BMP) - Practices designed to prevent or reduce water pollution.

big game - Large mammals such as deer, bear, elk, and antelope that are hunted for sport.

biological control - The use of natural means to control unwanted pests. Examples include introduced or naturally occurring predators such as wasps or hormones that inhibit the reproduction of pests. Biological controls can sometimes be alternatives to mechanical or chemical means.

biological diversity - The number and abundance of species found within a common environment. This includes the variety of genes, species, ecosystems, and the ecological processes that connect everything in a common environment.

biomass - The total weight of all living organisms in a biological community.

board foot - A measurement term for lumber or timber. The amount of wood contained in an unfinished board 1 inch thick, 12 inches long, and 12 inches wide.

broadcast burn - A prescribed fire that burns a designated area. These controlled fires can reduce wildfire hazards, improve forage for wildlife and livestock, or encourage successful regeneration of trees.

browse - Twigs, leaves, and young shoots of trees and shrubs that animals eat. Browse is often used to refer to the shrubs eaten by big game such as elk and deer.

buffer - A land area that is designated to block or absorb unwanted impacts to the area beyond the buffer. Buffer strips along a trail could block views that may be undesirable. Buffers may be set aside next to wildlife habitat to reduce abrupt change to the habitat.

C.

canopy - The part of any stand of trees represented by the tree crowns. It usually refers to the uppermost layer of foliage, but it can be used to describe lower layers in a multi-storied forest.

cavity - A hole in a tree often used by wildlife species, usually birds for nesting, roosting, and reproduction.

chemical control - The use of pesticides and herbicides to control pests and undesirable plant species.

clear cut - A harvest in which all or almost all of the trees are removed in one cutting.

climax - The culminating stage in plant succession for a given site. Climax vegetation is stable, self-maintaining, and self-reproducing.

composition - What an ecosystem is composed of.. Composition could include water, minerals, trees, snags, wildlife, soil, microorganisms, and certain plant species.

condition class – refers to the general deviation of ecosystems from their pre-settlement natural fire regime.

Class 1 – Fire regime within or near historical ranges. Risk of key ecosystem component loss low.

Class 2 – Fire regime moderately altered from historical range. Risk of key ecosystem component loss moderate.
Class 3 – Fire regime significantly altered from historical range. Risk of key ecosystem component loss high.
Class 9 – Fire regime within modified urban forested landscape.

conifer – A tree that produces cones such as a pine, spruce, or fir.

connectivity (of habitats) - The linkage of similar but separated vegetation stands by patches, corridors, or "stepping stones" of like vegetation. This term can also refer to the degree to which similar habitats are linked.

consumptive use - Use of resources that reduces the supply such as logging and mining.

contour - A line drawn on a map connecting points of the same elevation.

cover - Any feature that conceals wildlife or fish. Cover may be dead or live vegetation, boulders, or undercut streambanks. Animals use cover to escape from predators, rest, or feed.

cover type (forest cover type) - Stands of a particular vegetation type that are composed of similar species. The aspen cover type contains plants distinct from the pinion/juniper cover type.

created opening - An opening in the forest cover created by the application of even-aged silvicultural practices.

critical habitat - Areas designated for the survival and recovery of federally listed threatened or endangered species.

crown height - The distance from the ground to the base of the crown of a tree.

cultural resource - The remains of sites, structures, or objects used by people in the past. This can be historical or pre-historic.

cumulative effects - Effects on the environment that result from separate, individual actions that collectively become significant over time.

D.

dbh (diameter at breast height) - The diameter of a tree 4 and 1/2 feet above the ground on the uphill side of the tree.

decision criteria - The rules and standards used to evaluate alternatives to a proposed action on national forest land. Decision criteria are designed to help a decision maker identify a preferred choice from the array of alternatives.

desired future condition - Land or resource conditions that are expected to result if goals and objectives are fully achieved.

developed recreation - Recreation that requires facilities that in turn result in concentrated use of the area. For example, skiing requires ski lifts, parking lots, buildings, and roads. Campgrounds require roads, picnic tables, and toilet facilities.

dispersed recreation - Recreation that does not occur in a developed recreation site such as hunting, backpacking, and scenic driving.

disturbance - Any event, such as forest fire or insect infestations, that alter the structure, composition, or functions of an ecosystem.

Draft Environmental Impact Statement (DEIS) - The draft version of the Environmental Impact Statement that is released to the public and other agencies for review and comment.

E.

early forest succession - The biotic (or life) community that develops immediately following the removal or destruction of vegetation in an area. For instance, grasses may be the first plants to grow in an area that was burned.

ecological approach - An approach to natural resource management that considers the relationships among all organisms including humans and their environment.

ecology - The interrelationships of living things to one another and to their environment or the study of these interrelationships.

ecosystem - An arrangement of living and non-living things and the forces that move among them. Living things include plants and animals. Non-living parts of ecosystems may be rocks and minerals. Weather and wildfire are two of the forces that act within ecosystems.

ecosystem management - An ecological approach to natural resource management to assure productive, healthy ecosystems by blending social, economic, physical, and biological needs and values

ecotype - A population of a species in a given ecosystem that is adapted to a particular set of environmental conditions.

edge - The margin where two or more vegetation patches meet, such as a meadow opening next to a mature forest stand or a ponderosa pine stand next to an aspen stand.

endangered species - A plant or animal that is in danger of extinction throughout all or a significant portion of its range. Endangered species are identified by the Secretary of the Interior in accordance with the Endangered Species Act of 1973.

environmental analysis - An analysis of alternative actions and their predictable long and short-term environmental effects. Environmental analyses include physical, biological, social, and economic factors.

environmental assessment - A brief version of an Environmental Impact Statement (see Environmental Impact Statement).

Environmental Impact Statement (EIS) - A statement of environmental effects of a proposed action and alternatives to it. The EIS is released to other agencies and the public for comment and review.

ephemeral streams - Streams that flow only as the direct result of rainfall or snowmelt. They have no permanent flow.

erosion - The wearing away of the land surface by wind or water.

escape cover - Vegetation of sufficient size and density to hide an animal or an area used by animals to escape from predators.

even aged management - Timber management actions that result in the creation of stands of trees in which the trees are essentially the same age.

F.

fire cycle - The average time between fires in a given area.

fire flow – The amount of water needed in gallons per minute to fight a sustained fire attack in an individual, non-sprinklered building.

fire regime - The characteristics of fire in a given ecosystem such as the frequency, predictability, intensity, and seasonality of fire.

flood plain - A lowland adjoining a watercourse. At a minimum, the area is subject to a 1% or greater chance of flooding in a given year.

forage - All browse and non-woody plants that are eaten by wildlife and livestock.

forest cover type - See cover type.

forest health - A measure of the robustness of forest ecosystems. Aspects of forest health include biological diversity; soil, air, water productivity; natural disturbances, and the capacity of the forest to provide a sustaining flow of goods and services for people.

fuels - Plants and woody vegetation, both living and dead, that are capable of burning.

fuels management - The treatment of fuels that would otherwise interfere with effective fire management or control. For instance, prescribed fire can reduce the amount of fuels that accumulate on the forest floor before the fuels become so heavy that a natural wildfire in the area would be explosive and impossible to control.

function - All the processes within an ecosystem through which the elements interact such as succession, food chain, fire, weather, and the hydrologic cycle.

G.

Geographic Information Systems (GIS) - GIS is both a database designed to handle geographic data as well as a set of computer operations that can be used to analyze the data. In a sense, GIS can be thought of as a higher order map.

ground fire - A fire that burns along the forest floor and does nor affect trees with thick bark or high crowns.

ground water - The supply of fresh water under the earth's surface in an aquifer or in the soil.

group selection - A method of tree harvest in which trees are removed periodically in small groups. This silvicultural treatment results in small openings that form mosaics of age class groups in the forest.

H.

habitat - The area where a plant or animal lives and grows under natural conditions.

habitat diversity - A number of different types of wildlife habitat within a given area.

horizontal diversity - The distribution and abundance of different plant and animal communities or different stages of plant succession across an area of land. The greater the number of communities in a given area, the higher the degree of horizontal diversity.

hydrology - The science dealing with the study of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere.

I.

indicator species - A plant or animal species related to a particular kind of environment. Its presence indicates that specific habitat conditions are also present.

individual tree selection - The removal of individual trees from certain size and age classes over an entire stand area. Regeneration is mainly natural, and an uneven aged stand is maintained.

instream flow - The quantity of water necessary to meet seasonal stream flow requirements to accomplish the purposes of the national forests, including but not limited to, fisheries, visual quality, and recreational opportunities.

integrated pest management (IPM) - IPM evaluates alternatives for managing forest pest populations based on consideration of pest-host relationships.

interdisciplinary team - A team of individuals with skills from different disciplines that focuses on the same task or project.

intermediate cut - The removal of trees from a stand sometime between the beginning or formation of the stand and the regeneration cut. Types of intermediate cuts include thinning, release, and improvement cuttings.

intermittent stream - A stream that flows only at certain times of the year when it receives water from streams or from some surface source such as melting snow.

irreversible - A category of impacts mentioned in statements of environmental impacts that applies to non-renewable resources, such as minerals and archaeological sites. Irreversible effects can also refer to effects of actions that can be renewed only after a very long period of time such as the loss of soil productivity.

L.

ladder fuels - Vegetation located below the crown level of forest trees which can carry fire from the forest floor to tree crowns. Ladder fuels may be low-growing tree branches, shrubs, or smaller trees.

land class - The topographic relief of a unit of land. Land classes are separated by slope; this coincides with the timber inventory process. The three land classes used in the Forest Plan are defined by the following slope ranges: 0 to 35 percent; 36 to 55 percent; and greater than 55 percent.

land use planning - The process of organizing the use of lands and their resources to best meet people's needs over time according to the land's capabilities.

landline - The boundary lines for national forest land.

landscape - A large land area composed of interacting ecosystems that are repeated due to factors such as geology, soils, climate, and human impacts. Landscapes are often used for coarse grain analysis.

late forest succession - The stage of forest succession in which most of the trees are mature or over-mature.

litter (forest litter) - The freshly fallen or only slightly decomposed plant material on the forest floor. This layer includes foliage, bark fragments, twigs, flowers, and fruit.

logging residue (slash) - The residue left on the ground after timber cutting. It includes unutilized logs, uprooted stumps, broken branches, bark, and leaves. Certain amounts of slash provide important ecosystem roles such as soil protection, nutrient cycling, and wildlife habitat.

M.

M - Thousand. Example: Five thousand board feet of timber can be expressed as 5M board feet.

MBF - Thousand board feet (see board feet).

MIS (management indicator species) - A wildlife species whose population will indicate the health of the ecosystem in which it lives, and consequently, the effects of forest management activities to that ecosystem. MIS species are selected by land management agencies. (See "indicator species")

MM – Million.

MMBF - Million board feet. (See board feet)

macro climate - The general large scale climate of a large area as distinguished from the smaller scale micro climates within it.

management action - Any activity undertaken as part of the administration of the national forest.

mass movement/wasting - The down-slope movement of large masses of earth material by the force of gravity. Also called a landslide.

matrix - The least fragmented, most continuous pattern element of a landscape; the vegetation type that is most continuous over a landscape.

mature timber - Trees that have attained full development, especially height and are in full seed production.

micro climate - The climate of a small site. It may differ from the climate at large of the area due to aspect, tree cover (or the absence of tree cover), or exposure to winds.

mineral soil - Soil that consists mainly of inorganic material such as weathered rock rather than organic matter.

mitigation - Actions taken to avoid, minimize, or rectify the impact of a land management practice.

mixed stand - A stand consisting of two or more tree species.

monitoring and evaluation - The periodic evaluation of forest management activities to determine how well objectives were met and how management practices should be adjusted. (See "adaptive management")

mortality - Trees that were merchantable and have died within a specified period of time. The term mortality can also refer to the rate of death of a species in a given population or community.

mosaic - Areas with a variety of plant communities over a landscape such as areas with trees and areas without trees occurring over a landscape.

mountain pine beetle - A tiny black insect, ranging from 1/8 to 3/4 inch in size, that bores through a pine tree's bark. It stops the tree's intake and transport of the food and nutrients it must have to stay alive, thus killing the tree.

multiple use management - The management of all the various renewable surface resources of national forest lands for a variety of purposes such as recreation, range, timber, wildlife and fish habitat, and watershed.

N.

National Environmental Policy Act (NEPA) - Congress passed the NEPA in 1969 to encourage productive and enjoyable harmony between people and their environment. One of the major tenets of the NEPA is its emphasis on public disclosure of possible environmental effects of any major action on public lands. Section 102 of the NEPA requires a statement of possible environmental effects to be released to the public and other agencies for review and comment.

National Forest Land and Resource Management Plan (NFLRMP) - Also called the Forest Plan or the Plan. This document guides the management of a particular national forest and establishes management standards and guidelines for all lands of that national forest.

National Forest Management Act (NFMA) - This law was passed in 1976 and requires the preparation of regional guides and forest plans.

National Forest Recreation Sites (NFRS) - National forest recreation sites that have been inventoried.

natural barrier - A natural feature, such as a dense stand of trees or downfall, that will restrict animal travel.

natural resource - A feature of the natural environment that is of value in serving human needs.

no action alternative - The most likely condition expected to exist in the future if management practices continue unchanged.

non-commercial vegetative treatment - The removal of trees for reasons other than timber production.

non-consumptive use - The use of a resource that does not reduce the supply. For instance, bird watching is a non-consumptive use of wildlife. Boating and fishing are non-consumptive uses of water.

non-renewable resource - A resource whose total quantity does not increase measurably over time so that each use of the resource diminishes the supply.

nutrient cycle - The circulation of chemical elements and compounds, such as carbon and nitrogen, in specific pathways from the non-living parts of ecosystems into the organic substances of the living parts of ecosystems and then back again to the non-living parts of the ecosystem. For instance, nitrogen in wood is returned to the soil as the dead tree decays; the nitrogen again becomes available to living organisms in the soil, and upon their death, the nitrogen is available to plants growing in that soil.

O.

old growth - Old forests often containing several canopy layers, variety in tree sizes and species, decadent old trees, and standing and dead woody material.

organic soil - Soil at least partly derived from living matter such as decayed plant material.

over-mature timber - Trees that have attained full development, particularly in height, and are declining in vigor, health, and soundness.

overstory - The upper canopy layer; the plants below comprise the understory.

P.

park-like structure - Stands with large scattered trees and open growing conditions, usually maintained by ground fires.

partial retention - A visual quality objective that generally means man's activities may be evident but must remain subordinate to the characteristic landscape.

patch - An area of homogeneous vegetation in structure and composition.

percolation - Downward flow or infiltration of water through the pores or spaces of rock or soil.

perennial stream - A stream that flows throughout the year and from source to mouth.

permitted grazing - Grazing on a national forest range allotment under the terms of a grazing permit.

personal use - The use of a forest product, such as firewood, for home use and not for commercial use.

pole/sapling - The stage of forest succession in which trees are between 3 and 7 inches in diameter and are the dominant vegetation.

pole timber - Trees at least 5 inches in diameter but smaller than the minimum size for saw timber.

pre-existing use - Land use that may not conform to a zoning ordinance but existed prior to the enactment of the ordinance.

prescribed fire - Fire set intentionally in wildland fuels under prescribed conditions and circumstances. Prescribed fire can rejuvenate forage for livestock and wildlife or prepare sites for natural regeneration of trees.

prescription - Management practices selected to accomplish specific land and resource management objectives.

pre-suppression - Activities carried out in advance of fire occurrence to ensure effective suppression when the need arises.

productive - The ability of an area to provide goods and services and to sustain ecological values.

prognosis - A computer model for timber growth and yield. It projects per-acre growth and volume yield for commercial timber stands.

public land - Land for which title and control rests with a government---Federal, state, regional, county, or municipal.

R.

range - Land on which the principle natural plant cover is composed of native grasses, forbs, and shrubs that are valuable as forage for livestock and big game.

range of variability (also called the historic range of variability or natural range of variation) - The components of healthy ecosystems fluctuate over time. The range of sustainable conditions in an ecosystem is determined by time, processes (such as fire), native species, and the land itself. For instance, ecosystems that have a 10 year fire cycle have a narrower range of variation than ecosystems with 200-300 year fire cycle. Past management has placed some ecosystems outside their range of variability. Future management should move such ecosystems back toward their natural, sustainable range of variation.

recharge - The addition of water to ground water by natural or artificial processes.

reforestation - The restocking of an area with forest trees by either natural or artificial means such as planting.

regeneration - The renewal of a tree crop by either natural or artificial means. The term is also used to refer to the young crop itself.

release cutting - Removal of competing vegetation to allow desired tree species to grow.

removal cut - The removal of the last seed bearers or shelter trees after regeneration is established.

resilience - The ability of an ecosystem to maintain diversity, integrity, and ecological processes following a disturbance.

restoration (of ecosystems) - Actions taken to modify an ecosystem to achieve a desired, healthy, and functioning condition.

revegetation - The re-establishment and development of a plant cover by either natural or artificial means such as re-seeding.

riparian area - The area along a watercourse or around a lake or pond.

riparian ecosystem - The ecosystems around or next to water areas that support unique vegetation and animal communities as a result of the influence of water.

roundwood - Timber and fuel wood prepared in the round state such as house logs and telephone poles.

run-off - The portion of precipitation that flows over the land surface or in open channels.

S.

sanitation salvage - The removal of dead, damaged or susceptible trees primarily to prevent the spread of pests or disease and promote forest health.

Sapling - A loose term for a young tree more than a few feet tall and an inch or so in diameter that is typically growing vigorously.

sawtimber - Trees that are 9 inches in diameter at breast height or larger that can be made into lumber.

second growth - Forest growth that was established after some kind of interference with the previous forest crop such as cutting, fire, or insect attack.

sensitive species - Plant or animal species which are susceptible to habitat changes or impacts from activities. The official designation is made by the USDA Forest Service at the regional level and is not part of the designation of Threatened or Endangered Species made by the U.S. Fish and Wildlife Service.

single tree selection - See individual tree selection.

size class - One of the three intervals of tree stem diameters used to classify timber in the Forest Plan data base. The size classes are: Seedling/Sapling (less than 5 inches in diameter); Pole Timber (5 to 7 inches in diameter); Sawtimber (greater than 7 inches in diameter)

slash - The residue left on the ground after timber cutting or left after a storm, fire, or other event. Slash includes unused logs, uprooted stumps, broken or uprooted stems, branches, bark, etc.

snag - A standing dead tree. Snags are important as habitat for a variety of wildlife species and their prey.

stand - A group of trees that occupies a specific area and is similar in species, age, and condition.

standards and guidelines - Requirements found in a Forest Plan which impose limits on natural resource management activities, generally for environmental protection.

stewardship - Caring for the land and its resources to pass healthy ecosystems to future generations.

structure - How the parts of ecosystems are arranged, both horizontally and vertically. Structure might reveal a pattern, mosaic, or total randomness of vegetation.

succession - The natural replacement in time of one plant community with another. Conditions of the prior plant community (or successional stage) create conditions that are favorable for the establishment of the next stage.

successional stage - A stage of development of a plant community as it moves from bare ground to climax. The grass-forb stage of succession precedes the woody shrub stage.

suitability - The appropriateness of certain resource management to an area of land. Suitability can be determined by environmental and economic analysis of management practices.

sustainability - The ability of an ecosystem to maintain ecological processes and functions, biological diversity, and productivity over time.

sustainable - The yield of a natural resource that can be produced continually at a given intensity of management is said to be sustainable.

sustained yield - The yield that a renewable resource can produce continuously at a given intensity of management.

T.

thinning - A cutting made in an immature stand of trees to accelerate growth of the remaining trees or to improve the form of the remaining trees.

threatened species - Those plant or animal species likely to become endangered throughout all or a specific portion of their range within the foreseeable future as designated by the U.S. Fish and Wildlife Service under the Endangered Species Act of 1973.

Timber Stand Improvement (TSI) - Actions to improve growing conditions for trees in a stand, such as thinning, pruning, prescribed fire, or release cutting.

type conversion - The conversion of the dominant vegetation in an area from forested to non-forested or from one species to another.

U.

underburn - A burn by a surface fire that can consume ground vegetation and "ladder" fuels.

understory - The trees and woody shrubs growing beneath the overstory in a stand of trees.

uneven-aged management - Actions that maintain a forest or stand of trees composed of intermingling trees that differ markedly in age. Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection.

unsuitable lands - Forest land that is not managed for timber production. Reasons may be matters of policy, ecology, technology, silviculture, or economics

V.

variety class - A way to classify landscapes according to their visual features. This system is based on the premise that landscapes with the greatest variety or diversity has the greatest potential for scenic value.

vegetation management - Activities designed primarily to promote the health of forest vegetation for multiple-use purposes.

vegetation type - A plant community with distinguishable characteristics.

vertical diversity - The diversity in a stand that results from the different layers or tiers of vegetation.

viable population - The number of individuals of a species sufficient to ensure the long-term existence of the species in natural, self-sustaining populations that are adequately distributed throughout their range.

visual resource - A part of the landscape important for its scenic quality. It may include a composite of terrain, geologic features, or vegetation

W.

water table - The upper surface of groundwater. Below it, the soil is saturated with water.

water yield - The runoff from a watershed, including groundwater outflow.

watershed - The entire region drained by a waterway (or into a lake or reservoir). More specifically, a watershed is an area of land above a given point on a stream that contributes water to the stream flow at that point.

wildfire - Any wildland fire that is not a prescribed fire.

wildlife habitat diversity - The distribution and abundance of different plant and animal communities and species within a specific area.

woodland products - Harvestable items from pinion-juniper woodlands. These include fuel wood, posts, pine nuts, and Christmas trees.

Z.

Zone of Influence (ZOI) - The area influenced by Forest Service management activities.