

**ORDINANCE NO. 980**

**AN ORDINANCE ADOPTING THE 2023-2043 HOUSING CAPACITY ANALYSIS AND AMENDING THE HOUSING ELEMENT OF THE MADRAS COMPREHENSIVE PLAN.**

**WHEREAS**, the City of Madras (“City”) adopted the 2007 Urbanization Report as part of City’s Comprehensive Plan; and

**WHEREAS**, the 2007 Urbanization Report included a housing needs analysis that projected needs for various forms of housing; and

**WHEREAS**, the text of City’s Comprehensive Plan includes background information, findings, and policies based on the 2007 Urbanization Report; and

**WHEREAS**, the 2007 Urbanization Report is outdated and does not account for current population projections or housing trends; and

**WHEREAS**, City contracted with ECONorthwest to produce the 2023-2043 Housing Capacity Analysis (“HCA”) to replace the 2007 Urbanization Report; and

**WHEREAS**, City filed the land use application identified as Planning File No. PA-22-2 (the “Application”) to adopt the HCA as part of the Comprehensive Plan and to amend the text of the Housing Element of the Comprehensive Plan; and

**WHEREAS**, City provided appropriate notices to the Department of Land Conservation and Development, interested parties, and the public for the Application and a public hearing on the Application to be held by the City of Madras Planning Commission (“Planning Commission”); and

**WHEREAS**, after holding a public hearing on June 7, 2023, and after fully deliberating the matter, the City’s Planning Commission recommended that the City Council approve the Application; and

**WHEREAS**, City provided appropriate notices to interested parties and the public for a public hearing on the Application to be held by the Madras City Council (“City Council”); and

**WHEREAS**, after holding a public hearing on June 13, 2023, and fully deliberating the matter, the City Council voted to approve the Application.

**NOW, THEREFORE**, the City of Madras ordains as follows:

**SECTION 1: FINDINGS**

- 1.1 The findings contained in the recitals and those found in the staff report delivered at the June 27, 2023 public hearing before City Council are hereby adopted and incorporated herein by reference. City Council finds that the proposed amendments are consistent with the City’s Comprehensive Plan and statewide land use goals.

**SECTION 2: AMENDMENTS**

- 2.1 The HCA is hereby adopted and made part of the Comprehensive Plan. The HCA entirely supersedes and replaces the 2007 Urbanization Report.
- 2.2 The amendments to the Comprehensive Plan contained in the attached Exhibit A are hereby adopted.
- 2.3 The provisions of the Comprehensive Plan that are not amended or modified by this Ordinance No. 980 (this “Ordinance”) remain unchanged and in full force and effect. The amendments supersede any conflicting provisions and/or policies in any City enactment or adopted document. Staff is directed to take such actions as are necessary to incorporate and/or codify the adopted amendments into the Comprehensive Plan.

**SECTION 3: MISCELLANEOUS**

- 3.1 Severability. If any section, subsection, sentence, clause, and/or portion of this Ordinance is for any reason held invalid, unenforceable, and/or unconstitutional, such invalid, unenforceable, and/or unconstitutional section, subsection, sentence, clause, and/or portion will (a) yield to a construction permitting enforcement to the maximum extent permitted by applicable law, and (b) not affect the validity, enforceability, and/or constitutionality of the remaining portion of this Ordinance.
- 3.2 Corrections. This Ordinance may be corrected by order of the City Council to cure editorial and/or clerical errors.

**APPROVED AND ADOPTED** by the City Council of the City of Madras and signed by the Mayor this \_\_\_\_\_ day of July, 2023.

Ayes: \_\_\_\_\_  
 Nays: \_\_\_\_\_  
 Abstentions: \_\_\_\_\_  
 Absent: \_\_\_\_\_  
 Vacancies: \_\_\_\_\_

\_\_\_\_\_  
Mike Lepin, Mayor

ATTEST:

\_\_\_\_\_  
Keli Pollock, City Recorder

EXHIBIT A  
AMENDMENTS

[attached]

**CITY OF MADRAS**  
**COMPREHENSIVE PLAN**

Madras, Oregon

**REVISED THRU PERIODIC REVIEW**  
**ACKNOWLEDGED BY DLCD**  
**JUNE 20, 2003**

Prepared by Tenneson Engineering and  
Adopted by the City of Madras City Council on  
January 16, 1990

Revised through Periodic Review  
1998 - 2003

Amended by Ordinance No. 754  
Passed by Council on March 14, 2006

Amended by Ordinance No. 756  
Passed by Council on March 14, 2006

Amended by Ordinance No. 770  
Passed by Council on July 25, 2006

Amended by Ordinance No. 774  
Passed by Council on August 22, 2006

Amended by Ordinances No. 780, 781, and 785  
Passed by Council on December 12, 2006

Amended by Ordinance No. 797  
Passed by City Council on December 11, 2007

Amended by Ordinance No. 861  
Passed by Council on December 19, 2014

Amended by Ordinance No. 868  
Passed by Council on April 14, 2015

Amended by Ordinance No. 889  
Passed by Council on June 14, 2016

Amended by Ordinance No. 913  
Passed by Council on March 13, 2018

Amended by Ordinance No. 918  
Passed by Council on July 24, 2018

ACKNOWLEDGEMENTS:

Elected and Appointed Officials  
(During creation of the City's Comprehensive Plan)

CITY COUNCIL:

Dick Cowden, Mayor  
Jack McBride  
Reba Powell  
Ray Murray  
Paul Middleton  
Cliff Herzberg  
Greg Smith

CITY PLANNING COMMISSION

Ron Mobley, Chairman  
Bennie Jensen  
Georgie Meracle  
Jack Watts  
Rudy Younger  
Floyd Courtain  
Ray Carpenter

CITY STAFF:

Ray Carpenter  
Roy Moodenbaugh  
Bob Kingery  
Susan Finlay  
Robert Duke

CITIZENS INVOLVEMENT  
COMMITTEE:

A.P. Miller, City Recorder  
Sumner Rodriguez, City Attorney  
Dan Meader, Planning Consultant

COUNTY COURT:

Herschel Read, Judge  
Mary Norton  
Gordon Galbraith

COUNTY PLANNING COMMISSION:

Ted Freeman, Chairman  
Barbara Frazier  
Bill Donaghu  
Shirley Joscelyn  
Robert Farrell  
Dick Kingsbury  
Rube Evans

COUNTY PLANNING STAFF:

Bryan Christian, Former County Planner  
Bob Martin, County Planner  
Sandy Krueger, Planning Secretary  
Michael Sullivan, District Attorney

## REVISIONS TO COMPREHENSIVE PLAN

### ELECTED OFFICIALS

Royce Embanks Jr., Mayor  
Bartt Brick, Council Member  
Rosalind Canga, Council Member  
Jennifer Holcomb, Council Member  
Richard Ladeby, Council Member  
Denise Piza, Council Member  
Gary Walker, Council Member

### PLANNING COMMISSION MEMBERS:

Ali Alire  
Thomas Brown  
Joel Hessel  
Joe Krenowicz  
Marco Urieta-Leon

### CITY STAFF:

Gus Burrell, City Administrator  
Nicholas Snead, Community Development Director  
Karen J. Coleman, City Recorder  
Jeremy Green, City Attorney  
Garrett Chrostek, City Land Use Attorney

## TABLE OF CONTENTS

	PAGE
<b><u>CHAPTER 1 COMPREHENSIVE PLAN</u></b>	
<b><u>SECTION I INTRODUCTION</u></b>	
Introduction . . . . .	16
Purpose and Implementation of the Comprehensive Plan . . . . .	16 - 17
The Planning Process . . . . .	17 - 18
Citizen Involvement Plan . . . . .	18
Agency Involvement Program . . . . .	19
<b><u>SECTION II INVENTORIES</u></b>	
Background Information . . . . .	19
History . . . . .	19 -20
Physical Characteristics . . . . .	20
Topography . . . . .	20
Hydrology . . . . .	20
Climate . . . . .	20-21
Geology . . . . .	21
Soils . . . . .	21 - 22
Agriculture Lands . . . . .	22
General Discussion . . . . .	22 - 23
Forest Lands . . . . .	23
Natural Resources . . . . .	23 - 24
Air, Water & Land Resource Quality . . . . .	24
Natural Hazards . . . . .	24
Social Characteristics . . . . .	25
Recreation . . . . .	25
Economics . . . . .	25 - 30
Population . . . . .	30
Forecast Table . . . . .	30 - 31



**TABLE OF CONTENTS - CONTINUED**

**PAGE**

Factual Base . . . . .	32
Population Trends . . . . .	32 - 33
Socioeconomic Trends . . . . .	33 - 36
Summary of Findings . . . . .	36 - 38
Labor . . . . .	38 - 39
Housing . . . . .	39 - 40
Methods . . . . .	40 - 41
Residential Development Trends . . . . .	41 - 43
New Dwelling Units Needed, 2007-2027 and 2007-2057 . . . . .	43
Population . . . . .	44 - 45
Persons in Group Quarters. . . . .	45
Average Household Size . . . . .	46
Vacancy Rates . . . . .	46
Forecast of New Housing Units, 2007-2027 and 2007-2057 . . . . .	46 - 47
Housing Needs Analysis . . . . .	47 - 72
Public Facilities . . . . .	72
Water System . . . . .	72 - 73
Deschutes Valley Water District . . . . .	73 - 74
Source of Supply . . . . .	74 - 75
Future Projects and Timing . . . . .	76 - 77
Wastewater System. . . . .	77 - 78
Capital Improvement Projects and Timing . . . . .	79 - 80
Storm Water Drainage. . . . .	80
Projects and Estimates of Cost . . . . .	80 - 81
Projects . . . . .	81 - 83
Costs of Drainage Systems and System Dev. Charges . . . . .	83 - 84
Policies . . . . .	84 - 88
Schools . . . . .	88
Hospitals, Medical, Health & Mental Health . . . . .	88 - 89
Churches, Lodges, Farm Organizations . . . . .	89
Transportation . . . . .	89
Regional Setting. . . . .	89
Highways. . . . .	89 - 90
Railroads . . . . .	90
Air Transportation . . . . .	90 - 91
Bus Service . . . . .	91
Motor Freight . . . . .	91 - 92
Local Transportation . . . . .	92 - 93

**TABLE OF CONTENTS - CONTINUED**

**PAGE**

Energy . . . . . 93  
Urbanization . . . . . 93  
Jefferson County "A-3" Zoning Area . . . . . 94  
Urban Growth Boundary Description and Analysis. . . . . 95  
    Land Needed for Other Uses . . . . . 95 - 96  
    Summary of Land Need and Demand . . . . . 97  
    Comparison of Supply and Demand . . . . . 97 - 98  
Comprehensive Plan Amendment Addendum #2  
Periodic Review Work Task #1, A and B  
Adopted by Ordinance No. 703, January 14, 2003 . . . . . 99

[Madras Urban Reserves Report](#)  
[Adopted by reference as a supporting technical document](#)  
[Ordinance 810, October 8, 2008](#)

[Madras 2023-2043 Housing Capacity Analysis](#)  
[Adopted by reference as a supporting technical document](#)  
[Ordinance 980, July 25, 2023](#)

~~*Madras Urbanization Report,*~~  
~~*Adopted by reference as a supporting technical document*~~  
~~*Ordinance 797, December 11, 2007*~~

*Madras Economic Opportunity Analysis Update*  
*Adopted by reference as a supporting technical document*  
*Ordinance No. 889, June 14, 2016*

*Parks and Open Space Master Plan*  
*(November, 2004) Included in Comp Plan by Reference.*  
*[Ordinance No. 756, March 14, 2006]*

[Plan Amended by Ordinance No. 817,]  
[Passed by Council September 22, 2009]

[Water System Master Plan, 2014-2034](#)  
*Included in Comp Plan by Reference*  
*Ordinance No. 868, Passed by Council*  
*April 14, 2015*

[Wastewater Master Plan, May 2018](#)  
*Included in Comp Plan by Reference*

**TABLE OF CONTENTS - CONTINUED** **PAGE**

**SECTION III      GOALS AND POLICIES**

Goals and Policies . . . . .	100
Goal 1 - Citizen Involvement . . . . .	100
Policy . . . . .	100
Goal 2 - Establish Land Use Planning Process . . . . .	100
Policies . . . . .	100
Goal 3 - Preserve and Maintain Agricultural Lands . . . . .	100
Policies . . . . .	100
Goal 4 - Conserve Forest Lands for Forest Uses . . . . .	101
Goal 5 - Conserve Open Space & Protect Natural Resources. . . . .	101 - 102
Policies . . . . .	101
Historical Resources . . . . .	103 - 111
Goal 6 - Maintain & Improve Quality of Air, Water, & Land Resources . . . . .	111
Policies . . . . .	111
Goal 7 - Protect Life & Property From Natural Disasters And Hazards . . . . .	111
Inventory . . . . .	111 - 112
Flood . . . . .	112 - 114
Winter Storm . . . . .	114
Windstorm . . . . .	114 - 115
Earthquake . . . . .	115
Volcanic Event . . . . .	115
Drought . . . . .	116
Wildfire . . . . .	116
Landslide . . . . .	116
Goals, Policies & Implementation Measured. . . . .	117 - 122
Goal 8 - Satisfy Recreational Needs of the Citizens & Visitors	123
Goal 9 - Economic Development . . . . .	123
Goals . . . . .	123 - 124
Policies . . . . .	124 - 125
Implementation Measures . . . . .	125 - 126

Goal 10 - Housing Needs . . . . .	126
Policies . . . . .	126 - 127
Implementation Measure . . . . .	127 - 128
Goal 11 - Timely & Orderly Arrangement of Public Facilities . . . . .	128
Policies . . . . .	128 - 129

**TABLE OF CONTENTS - CONTINUED**

**PAGE**

Goal 12 - Provide & Encourage Safe, Convenient, & Economical Transportation System . . . . .	129
Policies . . . . .	129 - 130
Goal 13 - Conserve Energy . . . . .	130
Policies . . . . .	130
Goal 14 - Provide Orderly & Efficient Transition From Rural to Urban Land . . . . .	130
Policies . . . . .	130 - 131

**SECTION IV    LAND USE ELEMENT**

Land Use Element . . . . .	131
General Discussion . . . . .	131 - 132
Background for Land Use Category Decisions . . . . .	132 - 133
R-1 " <del>Single-Family Residential</del> <u>Moderate Density Residential</u> " . . . . .	134
R-2 " <del>Multi-Family Residential</del> <u>Higher Density Residential</u> " . . . . .	134
R-3 "Planned Residential Development" . . . . .	134
C-1 "Corridor Commercial" . . . . .	134 - 135
C-2 "Downtown Commercial" . . . . .	135
C-3 "Community Commercial" . . . . .	135
NC "Neighborhood Commercial" . . . . .	136
MUE "Mixed Use Employment" . . . . .	136
I "Industrial" . . . . .	136
O/S "Open Space" . . . . .	136 - 137
A/D "Airport Development" . . . . .	137
MPC "Master Planned Community: Overlay" . . . . .	137
FH "Floodplain" . . . . .	137 - 138
MO "Medical Overlay" . . . . .	138
AO "Airport Overlay" . . . . .	138

Establishment of Urban Growth Boundary & Urbanization . . . . .	138 - 139
Urban Growth Management Plan . . . . .	139
Areas Outside the Urban Growth Boundary . . . . .	140
Administrative Procedures . . . . .	140
Revisions . . . . .	140
Major Revisions (Legislative) . . . . .	140 - 141
Quasi-Judicial Revisions . . . . .	141 - 142
Urban Growth Boundary Revisions . . . . .	142 - 143

**TABLE OF CONTENTS - CONTINUED**

**PAGE**

<u>Public Facilities Plan</u>	
(Revised thru Periodic Review	
2003, Acknowledged by DLCDC) . . . . .	144 - 192

## LIST OF TABLES

		PAGE
	Climatological Data . . . . .	21
Table 1	Land uses within the Special Flood Hazard Area By acreage and percentage . . . . .	113
Table 2	Number of structures within the Special Flood Hazard Area . . . . .	113
Table S-1	Employment Forecast, Madras 2015-2035 . . . . .	27
Table S-2	Net acres of vacant and partially vacant land by generalized zoning, Madras UGB 2015 . . . . .	27
Table S-4	Forecast of land needed for employment, Madras UGB, 2015-2035 . . . . .	28
Table S-5	Forecast of land needed for all types of uses, Madras UGB, 2015-2035 . . . . .	28
Table 24	Madras UGB Population Forecast 2005 to 2030 . . . . .	31
Table 25	Madras City Limit Population 1980 to 2005 . . . . .	32
Table 26	Compound Growth Rates by Time Period City of Madras . . . . .	33
Table 27	Population by Age, City of Madras 1990 and 2000 . . . . .	35
Table 28	Place of Residence in 1995, Jefferson County and Madras Persons 5 Years and Over . . . . .	35
Table 29	Persons of Hispanic or Latino Origin City of Madras and Jefferson County, 1990 and 2000 . . . . .	36
Table 4-1	Dwelling units by type, Madras City Limit, 1990-2000 . . . . .	41
Table 4-2	Single-family building permits issued in Crook, Deschutes, and Jefferson Counties, 2001-September 2005 . . . . .	42
Table 4-3	Net density of single-family housing, Madras UGB . . . . .	43

## LIST OF TABLES, CONTINUED

		<b>PAGE</b>
Table 4-4	Historical and forecast population, City of Madras 1980-2057 . . . . .	44
Table 4-5	Demand for new housing units, Baseline Assumptions Madras, 2007-2027 and 2007-2057 . . . . .	47
Table 4-6	Distribution of new home sales prices for selected Subdivisions in Central Oregon cities, 2004 and 2005 Bend, Redmond, Prineville, Madras . . . . .	54
Table 4-7	Population by Age, City of Madras 1990 and 2000 . . . . .	59
Table 4-8	Place of residence in 1995, Jefferson County and Madras persons 5 years and over. . . . .	59
Table 4-9	Persons of Hispanic or Latino origin, City of Madras and Jefferson County, 1990-2000 . . . . .	60
Table 4-10	Analysis of affordable housing wage and rent gap by HUD income categories, Jefferson County, 2006 . . . . .	62
Table 4-11	Housing cost as a percentage of household income, Madras 2000. . . . .	62
Table 4-12	Rough estimate of housing affordability, Madras 2000 . . . . .	63
Table 4-13	Financially attainable housing type by income range, Madras, 2000 . . . . .	64
Table 4-14	Current unmet housing needs, 2006. HCS Model Output (Small City Version). . . . .	65
Table 4-15	Future dwelling units needed by type and price, 2006-2026, greater Madras, HCS Model Output . . . . .	66
Table 4-16	Tenure by housing type, Madras 2000 . . . . .	68
Table 4-17	Forecast of needed housing units by type, Madras, 2007-2027 and 2007-2057 Needed Dwelling Units . . . . .	69

## LIST OF TABLES, CONTINUED

		PAGE
Table 4-18	Forecast of needed housing units and residential Land, Madras, 2007-2027 and 2007-2057 . . . . .	71
Table 6-1	Summary of public and semi-public uses by Generalized plan designation, Madras, 2006 . . . . .	96
Table 6-2	Summary of public and semi-public uses by type, and Estimated land need, Madras, 2007-2027 and 2007-2057. . . . .	96
Table 6-3	Estimated total land need, Madras UGB, 2007-2027 and 2007-2057 Land Need (Gross Acres). . . . .	97
Table 6-4	Comparison of land supply and demand, Madras UGB, 2007-2027 and 2007-2057 . . . . .	98

## LIST OF TABLES IN PUBLIC FACILITIES PLAN

Table 1	Future Projects . . . . .	182 - 183
Table 2	Project Timing . . . . .	188
Table S-1	Madras UGB forecasts for population and DUs . . . . .	161
Table S-2	Wastewater Flow Projects for Madras UGB . . . . .	162
Table S-3	Wastewater Treatment Capacity Requirements . . . . .	167
Table S-4	Preferred Overall Treatment Scenario . . . . .	168
Table S-5	NWWTP Alternatives Recommended for Further Evaluation . . . . .	170
Table S-6	Capital Improvements Summary Estimates of Probable Costs and Anticipated Timing . . . . .	178 - 180



## LIST OF FIGURES

		<b>PAGE</b>
Figure 1	Elements of the Special Flood Hazard Area (SFHA) . . . . .	113
Figure 7	Age Distribution, Madras and Jefferson County, 2000 . . . . .	34
Figure 4-1	Madras population forecast, 1980-2057 . . . . .	45
Figure 4-2	Housing permits issued by county, U.S., 1994-2003 . . . . .	49
Figure 4-3	Percent of new homes built and sold in 2005, grouped by sales price for Prineville, Redmond, Bend, and Madras . . . . .	54
Figure 4-4	Age distribution, Madras and Jefferson County, 2000 . . . . .	58

## MISCELLANEOUS TABLES

Employment Figures . . . . .	38
Employment growth in Madras UGB, 2015-2035; and 2035-2057 . . . . .	39
Forecast of employment growth in by land use type, Madras UGB, 2015-2035 and 2035-2057 . . . . .	39
DVWD Future Projects and Timing . . . . .	76
City Wastewater Future Projects and Timing . . . . .	79 - 80
Storm Water Projects and Timing . . . . .	81 - 82
Schools Average Daily Membership . . . . .	88

## **FOREWARD**

### **PLANNING AREA**

While this document is titled the MADRAS COMPREHENSIVE PLAN, it must be recognized that the plan takes into consideration more than the corporate limits of the City of Madras. The plan was developed in close cooperation between the City of Madras and Jefferson County, and does allocate land resources outside the city limits. Because of this, it will be necessary for both governing bodies to adopt this plan: the Madras City Council for the lands inside the city limits, and the Jefferson County Court for those lands outside the city limits but inside the Urban Growth Boundary. The Urban Growth Boundary concept is relatively new to land use planning. Rather than attempt a definition here, it is recommended the reader turn to the Urbanization section on Page 55 for a complete explanation.

### **PLAN FORMAT**

The plan is divided into four basic elements. The first element, the Introduction, outlines the reasons for land use planning, the process by which it is done, and the Citizen's Involvement Program. The second element, the inventories, describes the existing conditions concerning a variety of topics within the planning area. This section also attempts to identify future needs for the planning area and project future requirements. The third element identifies the Goals and Objectives of the plan. This element indicates what the City wishes to happen over the next two decades. The fourth element, the Land Use Element, allocates the land resources of the planning area to specific types of land uses and designates the locations of these land uses on the Comprehensive Land Use Map.

Madras employs a one-map system where the City and County zoning maps for the area inside the Urban Growth Boundary serve as the Comprehensive Plan map. In order to establish certainty for property owners regarding the planned future urban use for land in the boundary, the City and County intend to adopt common zoning for land that is planned for employment uses, such as commercial and industrial land. These lands will be subject to common design and development standards and by agreement, the City will review development applications. The Comprehensive Plan map for these lands has been designed to be consistent with employment land needs in the adopted Economic Opportunities Analysis. Consequently, the process for rezoning properties that annex to the City when the base zoning is in common between the City and County may follow a streamlined land use approval process.

All other land in the UGB, unless designated for a special purpose (e.g. the Fairgrounds or the Madras Airport) is intended for residential use. County zoning for these lands may differ from City zoning and continue to have the zoning applied by the County prior to its inclusion in the UGB.

This **fourth** element also contains the formal policy statements concerning future growth and improvements in the planning area. The last portion of this element contains the administrative provisions of the plan. The administrative provisions deal with the methods by which the plan is changed or modified.

[Plan Format - Amended by Ordinance No. 889, passed by Council on June 14, 2016]

## **SECTION I**

### **INTRODUCTION**

The City of Madras developed and adopted a Comprehensive Plan in 1970. Requirements for the content of Comprehensive Land Use Plans were changed in 1973 by the Oregon State Legislature. The 1973 Legislature, through Senate Bill 100, established the Land Conservation and Development Commission. The Commission was charged with the duty of formulating a minimum criteria of what a Comprehensive Plan must address. This was done in the form of Statewide Planning Goals, which were adopted by the commission in 1975. The City Council reviewed the existing Plan and determined the Plan should be revised and updated to comply with the established Statewide Planning Goals and to meet changing needs of the City. The following pages contain the revised Comprehensive Plan for the City of Madras. The Goals and Objectives for the future development of Madras represent the decisions of interested citizens, elected and appointed officials, and other governmental agencies. These decisions are based on the best information available at the time of Plan formulation and development. This Plan is not meant to be cast in stone. As conditions and needs change over time, it shall be constantly monitored to insure that it responds to the community's requirements.

### **PURPOSE AND IMPORTANCE OF THE COMPREHENSIVE PLAN**

The Comprehensive Plan serves as a guide ~~for future community leaders~~ in making land use decisions regarding growth and development within the Madras Urban Growth Boundary. Based on the physical characteristics, objectives, and resources of the community, the Comprehensive Plan sets forth goals and policies aimed at meeting future needs of citizens, promoting a strong local economy, and protecting the livability of the Community. The Comprehensive Plan is further implemented by the Madras Development Code, which sets forth the specific criteria for individual land use applications. ~~Future land development must be in accordance with the adopted Plan. Recent Oregon Supreme Court decisions have clarified the importance of Comprehensive Plans by determining the Implementing Ordinances (Zoning and Subdivision) must be in accordance~~

~~with the Comprehensive Plan.~~ Because of the extreme importance of the Plan to the City, the planning process shall insure that:

- A. an adequate factual data base is developed;
- B. a broad Citizen Involvement Program is utilized; and
- C. information regarding the data and the draft and final adopted Plan are readily available to the public. The adopted Comprehensive Plan shall be on file at the Jefferson County Clerk's Office and at the Madras City Hall.

## **THE PLANNING PROCESS**

The planning process involves several steps. It is initiated by establishing some preliminary goals that the Plan should accomplish. This is usually done by noting any particular problems of the City and specific needs that should be addressed. The next step is to conduct inventories and assemble information concerning various topics and conditions as they exist within the planning area. For example, some of the topics the Plan will address include economics, natural resources, and public facilities.

After the information for each topic is assembled, tentative alternatives and goals are established. Once all topics have been inventoried and alternatives established, the next step is to compare the various goals and objectives alternatives with one another to insure compatibility. For example, it would not be compatible to project a population of 10,000 for a community and plan public facilities, such as schools, to serve a population of 2,000. This step, or phase, of the planning process requires the resolution of conflicts among the goals and objectives of the Plan and often will require some trade-offs between them.

Once the goals and objectives are compatible, the last phase or step of the initial planning process is the actual land resource allocation. This is the establishment of the various land use categories the City will utilize, such as residential, commercial, and industrial. These land use categories will be mapped on the Comprehensive Land Use Map to indicate the specific boundaries of each.

The adopted Plan is implemented by preparing and adopting Zoning and Subdivision Ordinances that carry out the goals and objectives of the Plan in terms of land use. The Planning Commission must then constantly monitor the Plan and Ordinances to determine their effectiveness. The Plan and Ordinance must be reviewed to insure they are responsive to the needs and desires of the residents of the City and planning area.

Both the City and County must adopt the Plan. The City and County Planning Commissions, after formulation of a draft Plan will conduct public hearings to receive citizen input. Once that is completed and necessary revisions to the draft Plan made, the Commissions will recommend the draft to their respective governing bodies, the Madras City Council and the Jefferson County Court. Both of the elected bodies will conduct public hearings on the Plan prior to adopting it. The Plan must be adopted by Ordinance by both elected bodies.

The City Planning Commission began work on the revision of the Comprehensive Plan in April of 1977. The Commission met every two weeks in workshop sessions to review the assembled data. The information gathering and coordination of the planning process were accomplished in cooperation with the Jefferson County Planning Commission and staff. To insure the maximum public input into all phases of the planning process, the Madras City Council appointed a separate Committee for Citizen Involvement in June 1976. The Committee formulated and recommended for adoption the following Citizens Involvement Program.

### **Citizen Involvement Plan:**

The City shall provide opportunities for citizen involvement in all phases of the planning process. The process shall include a series of workshop meetings and public hearings to discuss inventories, identify the needs, formulate goals and objectives, consider alternatives, and finally adopt a Comprehensive Plan. The City will provide opportunities for citizen involvement in the preparation and adoption of the Implementing Ordinances.

The City shall publicize the opportunities for citizen involvement by the following methods:

- A. The City shall post notices of Planning Commission meetings, outlining the date, time, place and topics to be discussed, on public bulletin boards within the City. This would include the City Hall, the County Courthouse, and local markets.
- B. In addition to the Oregonian and the Oregon Journal, there are two newspapers serving the area--the Madras Pioneer (a weekly), and The Bulletin (a Bend daily). Both papers have indicated a willingness to publish articles announcing meetings and general discussions of Planning Commission topics including any decisions that are rendered.
- C. Madras has a local television weather channel that allows placement of local notices. This is anticipated to provide an excellent method of notification to the general public.
- D. Local service organizations and clubs shall be informed on Planning Commission progress and discussion topics. These organizations include the Lions, Kiwanis, Chamber of Commerce, Epsilon Sigma Alpha Sorority, and the Jaycees.
- E. Technical assistance shall be provided to the Planning Commission and the general public by a planning consultant retained by the City. In addition, technical assistance is available from the City Manager's office. As Madras is the County Seat of Jefferson County, both the County Planner and the County Extension Agent have indicated a willingness to assist in the planning process and to provide assistance to interested citizens.

The Citizens Involvement Program will provide more than adequate means of communication between local government and residents. The workshop meetings and public hearings shall be conducted in a manner that will draw the maximum amount of citizen input available. Citizens will be asked to assist in developing inventories and reviewing progress of the Planning Commission.

Most of the methods outlined in the Citizens Involvement Program can be accomplished with little cost other than time. The City has budgeted \$250 per year toward implementation of the Citizens Involvement Program.

### **Agency Involvement Program:**

A list of local, state and federal agencies and special districts was compiled at the outset of the planning process. These governmental units all have an interest in the development of the Comprehensive Plan for Madras. All interested agencies were notified and their input was requested during the planning process. In addition, many agencies were contacted personally by City staff to develop the data base from which the Plan is formed. All interested agencies have been given the opportunity to review and comment on the draft Plan. The City Council adopted the Citizens and Agency Involvement Program on June 8, 1976.

## **SECTION II**

### **INVENTORIES**

#### **BACKGROUND INFORMATION**

The City of Madras is located near the center of Jefferson County. It is at the junction of U.S. Highway 26 and U.S. Highway 97, and is approximately 120 miles southeast of the City of Portland. The City serves as a retail service center for the surrounding agricultural lands. In addition, the City provides tourist facilities for travelers enjoying the many recreational opportunities of the Central Oregon area. Madras serves as the County Seat of Jefferson County and is the largest of the three incorporated cities within Jefferson County. **In 2005 the City undertook a comprehensive look at the different characteristics of commercial areas within the City. This planning process resulted in new commercial standards for three distinct commercial districts.**

**[Last two Sentences Added by Ordinance No. 770, Passed July 25, 2006]**

#### **HISTORY**

The first white man in the area was Peter Skene Ogden, a trader for the Hudson Bay Company. On his second Snake River journey from Fort Nez Perce (Walla Walla) between November, 1825, and July, 1826, he crossed the Deschutes River near the mouth. From the present site of The Dalles, he followed a route west of Tygh Ridge and crossed the Warm Springs and Deschutes Rivers again to arrive at the present site of Madras. From there he followed the Crooked River and made his way back to the Snake River. In 1843, John C. Fremont, guided by Kit Carson, crossed the Warm Springs area on his way to Nevada. Due to Indian trouble, settlement of the area did not follow very fast. In fact, settlement was discouraged officially. On August 7, 1856, General John E. Wool, Commander of the Department of the Pacific of the U.S. Army, issued an order to Colonel George Wright at The Dalles forbidding immigrants to locate east of the

Cascades. The Cascade Mountain Range was considered a wall of separation between the Indians and the Whites. This order was revoked by General Harney on October 31, 1858. In 1862, the first road was built across the Cascades in order to provide a passageway for traders who wanted to supply the towns in Eastern Oregon, where mining was under way. As a result of these roads, White settlers began to move into what is now Jefferson County.

In 1855, treaties were drawn up with bands of the Wasco and Walla Walla Indians, creating the Warm Springs Indian Reservation. In addition to the Wasco and Walla Walla Indians, a number of Paiutes arrested during the military campaign against them between 1865 and 1868 were also settled on this reservation. White settlers soon began to fill every available site with homes and farms. Shortly after 1900, the construction of two railroads began between the Columbia River and Madras. The two lines were on opposite sides of the Deschutes River, and the crews had constant feuds and many bloody battles. Finally, the Deschutes line, backed by E.H. Harriman, was abandoned. The Oregon Trunk Railroad, built by James J. Hill, is still in operation. Arrival of the railroad in Madras was observed in Madras in ceremonies held February 15, 1911. At about this time, the first irrigation project was started.

## **PHYSICAL CHARACTERISTICS**

### **Topography:**

The City of Madras lies in a basin at the head of the Willow Creek Canyon which cuts through Agency Plains to the Deschutes River. The land is moderately sloping except on the north side of the Town where it slopes steeply up to the Agency Plains. Except for the Madras Industrial Park, which is located on Agency Plains and tends to slope to the west, both the south and north areas drain into the City to Willow Creek.

The elevation at the lowest part of Madras is about 2,230 feet. The elevation in the south area varies from 2,260 to 2,420 feet. The elevation in the north area varies from 2,250 feet to 2,480 feet on Agency Plains.

### **Hydrology:**

Most of the planning area lies in the Willow Creek basin, a sub-basin of the Deschutes River basin. Willow Creek is an intermittent stream that normally flows from about mid-December through mid-July. During the summer and fall months, irrigation runoff and occasional heavy thunder showers are the only sources of flow to the creek.

The groundwater table occurs at an altitude of about 1,900 feet in the Madras area (approximately 300 feet below the ground surface) and appears to have a gradient to the northwest, under Agency Plains to the Deschutes River. Perched groundwater can be found in a gravel layer on top of impermeable sandstone in some areas of Town. This water may be as shallow as 18 to 20 feet below the ground surface and appears to lie in old stream beds of Willow Creek.

### **Climate:**

The Madras area lies in the weather shadow of the Cascade Range, causing a semi-arid climate. The area receives only about 10 inches of precipitation annually and experiences nearly 50 inches of evaporation. The area has an average annual snowfall of about 15 inches and a growing season of 100 days.

<u>Climatological Data:</u>		
<u>Month</u>	<u>Mean Temperatures</u>	<u>Precipitation Normals in Inches</u>
January	31.1 L F.	1.33
February	36.9	0.83
March	39.8	0.69
April	45.5	0.53
May	52.7	1.04
June	59.2	1.10
July	65.5	0.33
August	64.0	0.34
September	57.8	0.48
October	47.9	0.80
November	39.1	1.41
December	34.1	1.31
ANNUAL	47.8	10.19

**Geology:**

Madras lies in a small valley in a broad flat plain, which lies between the Cascade Mountains on the west and the Ochoco Mountains on the east. This valley is rimmed on the west by the edge of a basaltic lava flow, sometimes called the "Rimrock Lavas".

The area is underlain by the Madras formation, composed of stratified layers of sand, silt, ash, and pumice and contains some gravel lenses and interbed lava flows. The sedimentary layers of this formation are fine grained and do not provide a good aquifer, but the gravel lenses and interbed volcanic material yield moderate to large supplies of groundwater.

**Soils:**



The soils found in the area are predominantly of Madras and Metolius series. Metolius series are found in a narrow strip along Highway 97 north of Town and soils generally classified as Roughland, Scabland, Volcanic Ash, and Agency soils are found along the rimrock along the west side of the planning area.

The Metolius soil is a well-drained, sandy loam soil formed from alluvial or aeolian materials. The permeability is moderately rapid, but the runoff is slow. Because of the potential to flooding, the soils have been given a moderate rating for septic tank installations. These soils are highly suited for agricultural crops having an effective rooting depth of 60 inches or more. The Soil Conservation Service has rated the Metolius series in Capability Classifications II and III, when irrigated.

The Madras series found in the planning area consists of sandy loam soils formed in colluvium. The soils are relatively shallow, having a depth to hardpan of 20 to 30 inches and a depth to bedrock of 25 to 40 inches. Both the hardpan and bedrock are "rippable". The Soil Conservation Service has rated the Madras series soils in Capability Classifications II, III, and IV, with irrigation. Drainage varies from rapid through the surface layers to very slow through the hardpan. The Madras soils generally have moderately severe to severe limitation for use for tilled crops. The land is used primarily as range land and dry farming with a low yield of grain crops being produced.

The Roughland, Scabland, and Volcanic Ash and the Agency soils found along the "rimrock" are too stony to be tilled. Steep slopes limit irrigation, making this land unsuitable for agricultural uses.

A soils map is not provided. A complete analysis of each soil type, together with soils maps, is available in the technical information as provided by the Soil Conservation Service. There are no "weak foundation" soils in the planning area.

### **Agricultural Lands:**

Within the present city limits of Madras there is very little agricultural production, with the exception of some open lands used for pasturing livestock. There are several small acreages of producing agricultural lands in the Madras planning area. The principal crops are wheat, mint, and potatoes.

### **General Discussion:**

Existing land use patterns in the Madras planning area pose difficult problems for comprehensive planning. The City has grown in a linear fashion from South to North, covering a large area--over four miles. In recent years, development has begun to move East and West from the City. Much of the development outside the City has occurred without the concurrence of the City. The Deschutes Valley Water District provides domestic water outside the city limits. The availability of public water and the allowance of septic tanks on 10,000 square foot lots with the public water has made the larger lot outside the City more attractive than smaller lots with additional taxes inside the City. The result has been development of an urban fringe area of over 12 square miles. Lands within that area, which are suitable for agricultural purposes have been maintained,

primarily by the economic marketplace more than planning or zoning regulations. The land use pattern that has resulted is a patchwork quilt of agricultural lands on the flat lands with rural subdivision on ridges, the non-farmable lands. The City does not wish to discourage the continuation of farming on suitable lands in the urban area. However, in order to provide sensible planning for the future, future needs must be anticipated and the City considers the lands within the designated Urban Growth Boundary suitable for development over time.

### **Forest Lands:**

There are no forest lands in the planning area; therefore, the State Planning Goal concerning forest lands is not applicable.

### **Natural Resources:**

The geographic location of the Madras planning area in Central Oregon precludes the existence of many natural resources. There are no known mineral and aggregate resources, energy sources, or ecological and scientific natural areas within the planning area. There are also no wetlands or watersheds, wilderness areas, cultural areas, or developed recreation trails within the planning area.

The existing development patterns of the City provide large areas of open space intermixed between areas of development. The City maintains a large City Park in the downtown core area. The park offers picnicking and limited playground facilities for children. A small neighborhood park on the northeast side of the City is yet to be developed.

The stream of Willow Creek passes through Madras in a westerly direction. Willow Creek is an intermittent stream, which normally flows from mid-December through mid-July. During the summer and fall months, irrigation runoff and occasional heavy thundershowers are the only source of flow to the creek. Because of the periods of no flow during the summer months, there are no fish or fish habitats in the stream.

The groundwater table occurs at an altitude of about 1,900 feet in the Madras area and is approximately 300 feet below the ground surface. It appears to have a gradient to the northwest under Agency Plains to the Deschutes River. The first groundwater can be found in a gravel layer on top of impermeable sandstone in some areas of Town. This water may be as shallow as 18 to 20 feet below the ground surface and appears to lie in old stream beds of Willow Creek.

Almost any location in the City offers scenic views and vistas of the nearby Cascade Mountain Range. It is the desire of the City to preserve this scenic resource for the enjoyment of the residents of the City. To that end, the City shall establish height regulations to limit the height of structures, residential and commercial, in the ~~Zoning Ordinance~~ [Development Code](#).

There are two historic structures the City wishes to preserve in Madras. These are the old City Hall/County Courthouse and jail constructed in 1911. The City Hall/County Courthouse has been recently renovated and now serves as an office building for governmental agencies. The second story of the building is being converted into a museum operated by the Jefferson County Museum Association. Other historic sites identified by the Statewide Inventory of Historic Sites and

Buildings in 1976 include the Madras Railroad Depot, the Madras Hotel, the Madras Conservative Baptist Church, the IOOF Hall, and the Mason House. These structures are under private ownership. The City will cooperate with the Museum Association should any of the structures become available for restoration. In the 1988 Periodic Review, the City officially designated the IOOF Hall as an historic resource.

Wildlife in the area is limited to those species, which are common to urban residential areas. There are no known endangered species in the area.

### **Air, Water, and Land Resource Quality:**

The air quality of the Madras planning area is considered quite good. There are five or six industrial plants, which are known to discharge particulate matter into the atmosphere. These are not known to violate current state and federal regulations. The nearest Department of Environmental Quality monitoring station is located in Bend.

The City's source of domestic water is supplied by Deschutes Valley Water District (DVWD). The City of Madras has three wells, which supplement watering of yards during the summer months. Two of the existing wells are located to the North of the City and are approximately 175 to 200 feet apart. The third is located West of the City maintenance shops. The wells are drilled to a depth of 300 to 450 feet.

The City has constructed, within the existing city limits, two separate wastewater collection systems, one to the north and the newest system to the east of the city. The City of Madras requires all users inside the City to connect to this system. Areas outside the City have been utilizing septic tanks and drainfields on 10,000 square foot lots where a public water system is available. The City developed with the assistance of the Environmental Protection Agency, a facilities plan. This plan was developed in October, 1976 to provide collection facilities to these outlying areas. The facilities plan notes that drainfields in the study area have very limited effectiveness because of the shallow topsoil. The impervious layer of sandstone just under the surface in most areas keeps the wastes in the very shallow topsoil. In most of the planning areas, the topsoil cannot meet the statewide requirements for drainfields. The area adjacent to the City, proposed to be provided with a wastewater collection system, is approximated by the Urban Growth Boundary as indicated on the Comprehensive Plan Map. Further support of the boundary designation is indicated by a recent study by the Oregon State Department of Environmental Quality. The study of the area surrounding the City of Madras revealed heavy use of sanitary sewage disposal wells. Oregon Revised Statutes require the discontinuation of the use of disposal wells by the first of January, 1980. The area involved adjacent to the City totals approximately 1,300 acres and involves over 400 structures. Over 300 of those structures presently utilize disposal wells as a means of sanitary sewer disposal. In order to meet Oregon law, this area must be considered for future sanitary sewer service when establishing an Urban Growth Boundary. The City of Madras recently expanded its Urban Growth Boundary, which will provide urban services to those properties when they are annexed into the city limits; or, if a health hazard exists on the parcel.

### **Natural Hazards:**

For background information related to Natural Hazards, refer to Section III of this Plan.

[This section was revised by Ordinance No. 861 - Passed by Council on December 19, 2014.]

## **SOCIAL CHARACTERISTICS**

### **Recreation:**

The geographic location of the City, in the heart of the Central Oregon recreational area, provides a natural environment for the enjoyment of outdoor recreational activities. The City hosts many visitors who enjoy the fishing, water sports, and rockhounding opportunities that the area offers. Cove Palisades, a major Oregon State Park, lies approximately nine miles southwest of the City. The park offers outstanding fishing, waterskiing, and camping facilities. Currently, over one-half million people visit the park each year. Madras serves as the commercial center for the area.

Most recreational activities available to area residents and visitors take place outside the City. Because of this, the City has only one developed City park. The park is provided with playground equipment for use by small children. There are also playgrounds available at both school locations. In addition, there are three baseball diamonds located at the County Fairgrounds. An extensive area wide Little League Baseball program is available each year.

Other major recreational opportunities in or near the City include a public nine-hole golf course to the North of the City and an indoor rodeo arena at the Jefferson County Fairgrounds. The County Fairgrounds hosts the annual county fair, an annual rockhounds' convention, and various 4-H and FFA activities.

There are three active gun clubs with rifle, pistol, and shotgun ranges located outside the City. The Central Oregon area offers some of the finest hunting in the State and many local residents are quite active in this outdoor sport.

Tennis is becoming a major summer recreational activity in the area, although at the present time there are only four tennis courts in the City. The resultant overcrowding indicates the need for additional facilities. There has been recent interest in handball and racquet ball courts.

The City has also determined a need for a municipal swimming pool. The City has begun to consider the feasibility of obtaining the necessary lands to construct a recreation facility that would meet the needs of the City. This would include tennis and handball courts, swimming pool, and other recreational activities.

The topography and street layout of the City makes the use of bicycles very practical. Providing funding can be obtained, the City would like to establish several bike paths throughout the City. The City, in cooperation with Jefferson County, would like to improve and maintain a hiking/bike path along Willow Creek. Some of the path is inside the City with the remainder in Jefferson County. The now abandoned railroad bed along Willow Creek down to Pelton Dam is an excellent base for the path, but it needs to be upgraded. The path is now being utilized by local joggers.

### **Economics:**

The City of Madras serves as the regional shopping and employment center for all of Jefferson County. Economic activity is conducted both within the existing city limits and in the surrounding lands adjacent to the city limits. The main commercial activity is conducted along the two main streets of the City which stretch out over two miles. There are various types of commercial and industrial activity carried on within these boundaries. In 2007 the City undertook a comprehensive look at land needs both for housing and employment uses, with an emphasis on commercial areas within the City. This planning process resulted in new commercial standards for three distinct commercial districts: Downtown Commercial, Neighborhood Commercial, and General Commercial.

[The last two sentences of this paragraph were added by Ordinance No. 770, Passed by Council on July 25, 2006. The text was modified again by Ordinance No. 889, adopted by Council on June 14, 2016]

In 2015, the City commissioned the preparation of *Madras Economic Opportunities Analysis - 2015-2035 (EOA)*, including updates to city employment forecasts, a buildable lands inventory, land needs analysis, and other essential information for its Goal 9 – Economic Development factual basis. The EOA is hereby included by reference as a technical element of the *Madras Comprehensive Land Use Plan*.

The EOA provides current information about Madras' economy and commercial and industrial land base. The EOA's findings and recommendations were relied on to update Madras' land use policies related to economic development and to guide amendments to City and County zoning and growth management procedures. The following summary information was extracted from the EOA.

Table S-1 summarizes population and employment forecasts for Madras. The population forecast is the official, adopted forecast for the City. The employment forecast shows Madras growth at 3.35% per year between 2015-2035.

Table S-2 summarizes information for Madras inventory of land designated for employment uses. Madras has about 1,073 acres of employment land within the current Urban Growth Boundary (UGB). The City has about 444 acres of buildable commercial and industrial, land within its UGB. The majority of land (384 acres) is vacant, with 14% of employment land categorized as partially vacant. Two-thirds of Madras' vacant and partially vacant land is in the Industrial zone (182 acres) or in the Airport Development zone (119 acres).

Employment forecasts indicate that Madras will add 3,543 jobs between 2015 and 2035, excluding land for government employment.<sup>1</sup> The EOA identifies opportunities to accommodate about 477 employees on land with existing development, through redevelopment and filling of vacant built spaces.

Table S-4 shows that Madras will grow by 3,066 jobs, requiring 258 gross acres of land for the 2015-2035 period. Table S-5 indicates that the City has enough land within the UGB to accommodate expected growth over the 2015-2035 period.

---

<sup>1</sup> In the 2007 Madras Urbanization Report, land needed for government employment was accommodated through an analysis of land needed for public and semi-public lands, including uses such as government offices and schools. This analysis excludes government employment to avoid double counting land need for public uses.

Table S-1. Employment forecast, Madras 2015-2035

Year	Total Employment
2015	4,808
2035	9,292
2057	16,205
<b>Change 2015 to 2035</b>	
Employees	4,484
Percent	93%
AAGR	3.35%

Table S-2. Net acres of vacant and partially vacant land by generalized zoning, Madras UGB, 2015

Development Status/Zone	Number of Tax Lots	Total Acres	Vacant, %		Percent of Vacant, %
			Unsuitable Acres	Suitable Acres	
<b>Partially Vacant</b>					
AD	1	60	23	37	8%
C1	2	7	2	5	1%
CC	2	5	3	3	1%
I	1	22	7	15	3%
<b>Subtotal</b>	<b>6</b>	<b>94</b>	<b>34</b>	<b>60</b>	<b>14%</b>
<b>Vacant</b>					
AD	15	82	0	82	18%
C1	54	86	4	82	19%
C2	16	5	2	3	1%
C3	11	3	0	3	1%
CC	14	44	0	44	10%
I	24	167	0	167	38%
NC	1	3	0	3	1%
<b>Subtotal</b>	<b>135</b>	<b>390</b>	<b>6</b>	<b>384</b>	<b>86%</b>
<b>All Land</b>					
AD	16	142	23	119	27%
C1	56	93	5	87	20%
C2	16	5	2	3	1%
C3	11	3	0	3	1%
CC	16	49	3	47	11%
I	25	189	7	182	41%
NC	1	3	0	3	1%
<b>Total</b>	<b>141</b>	<b>484</b>	<b>40</b>	<b>444</b>	<b>100%</b>

Source: Jefferson County GIS data; analysis by ECONorthwest

Table S-4 Forecast of land needed for employment, Madras UGB, 2015-2035

Land Use Type	Emp. on Vacant Land	EPA (Net Acres)	Land Demand (Net Acres)	Land Demand (Gross Acres)
<b>Employment Growth 2015-2035</b>				
General Industrial	963	10	96	113
Airport-Related Industrial	235	10	24	28
Retail Commercial	496	20	25	31
Non-Retail Commercial	1,372	20	69	86
<b>Total</b>	<b>3,066</b>		<b>214</b>	<b>258</b>

Source: ECONorthwest

Table S-5 Forecast of land needed for all types of uses, Madras UGB, 2015-2035

Land Use Type	Land Supply (Gross Acres)	Employment Growth 2015-2035	
		Land Demand (Gross Acres)	Land Surplus (Deficit)
General Industrial	182	113	69
Airport-Related Industrial	119	28	91
Commercial and Retail	143	117	26
<b>Total</b>	<b>444</b>	<b>258</b>	

Source: ECONorthwest

The key findings of the EOA are that:

- Madras has a surplus of land for commercial and retail uses. Madras' commercial land surplus to accommodate growth for the 20-year planning period is about 28 gross acres. The majority of Madras' vacant commercial land is in the C-1 and CC zones, with concentrations of vacant land in the southern section of Madras along Highways 97 and 26 and the middle part of Madras along Highway 97.
- Madras has a surplus of general industrial land. The surplus of Industrial (I) land is about 69 gross acres. All of Madras' vacant industrial land is located in the northern part of Madras, near the Madras Airport and along Highway 26. Two-thirds of Madras' vacant Industrial land is in two sites, one with 42 acres of vacant suitable land and the other with 75 suitable acres of vacant.
- Madras has a limited number of smaller general industrial sites. General industrial businesses in Madras will need sites on a variety of sizes, including sites smaller than 5-acres, sites 5 to 20 acres, and sites larger than 20 acres. Madras' supply of general industrial sites are all near the Airport, with five vacant suitable sites smaller than one acre, 10 sites between 1 to 2 acres, and seven sites between 2 and 5 acres.

- Madras has a surplus of airport-related industrial land. The surplus of Airport Development (AD) land is 91 gross acres, all of which is located at the Madras Airport. AD land is in a range of site sizes from one acre parcels to a 27 acre parcel.

Based on these findings and the analysis in the EOA, we provide the following recommendations:

- Madras should provide a variety of types of sites for employment. Not all traded-sector employment is industrial or will locate in industrial areas. Traded-sector businesses are businesses that produce goods or services that are exported out of the community, bringing money into the community. Some examples of traded-sector businesses in office settings include software development, professional and technical services that provide services outside of the community, or finance and insurance businesses that provide services outside of the community.
- These types of traded-sector employment may locate in a variety of locations and building types, such as in an office building in downtown or in an office park. By implication, Madras will need to provide a variety of opportunities for employment growth in industrial areas, in commercial areas, and in mixed-use areas like downtown. Madras should evaluate opportunities for developing a zone that will allow a mixture of industrial and non-residential commercial employment. The best area for this type of zone would be along a State highway, in an area with vacant land in sizes ranging from smaller than an acre up to 10 acre sites.
- Madras should evaluate whether the existing industrial land supply meets the City's economic development goals. All of the land is located near the airport, along Highway 26 and two-thirds of the land is concentrated in two larger sites. Discussions with City staff and EDCO staff indicate that the owner of the larger site is unwilling to sell or lease the land and has no apparent intention of doing so in the foreseeable future.
- In addition, Madras has 24 Industrial sites smaller than five acres (about 50 acres of land), all of which are located near the Madras Airport. More than 90% of existing employment in Madras is located on sites smaller than five acres, with nearly all of Madras' employment on Industrial zoned sites located on sites smaller than five acres.
- The site needs of the target general industrial industries suggest that these industries will need sites in a variety of sizes, including small sizes, in a variety of locations throughout the city, with access to state highway, as well as some with access to rail. The City should evaluate opportunities to rezone land within Madras in areas that meet the need for smaller sites.
- Madras should revise its land development policies to meet the needs identified in the EOA. Madras may need to update its Comprehensive Plan policies to align with the City's economic development goals. In addition, the City may need to redesignate or rezone land to meet the needs identified in the EOA, especially for small to mid-sized industrial sites in areas away from the Madras Airport. The surplus of commercial land in the southern portion of the Madras UGB, along Highways 97 and 26, provide an opportunity for rezoning land from commercial uses to employment uses in a new zone that allows both commercial and light industrial employment, focusing on traded-sector employment.



- Madras should continue to coordinate economic development opportunities at the Madras Airport to further the community’s economic development goals. Although land at the Madras Airport is not within the UGB, this land is a key economic development asset. Much of the recent economic growth in Madras is focused on city-owned land at the Airport, with the planned expansion of a business involved in vehicle testing. Land at the Madras Airport is city-owned, which gives the City opportunities to focus on development of businesses that meet the City’s economic development objectives, especially with attracting family-wage jobs.
- Encourage redevelopment of existing commercial areas. The City has a substantial supply of commercial land, some of which may have redevelopment potential over the next 20 years. However, as the City develops new residential areas, these areas may need commercial development to provide commercial retail nodes in new neighborhoods. The City should encourage redevelopment of underutilized commercial areas in places with demand for new commercial development. The City has policies to facilitate redevelopment of employment areas, such as designating areas as urban renewal areas.
- Madras should monitor and report on industrial and commercial land development. The City should monitor and report on development and redevelopment of employment land. Monitoring can help the City understand where there is employment land pressure, allowing the City to better respond to the market. Monitoring also allows the City to track land development, as a means to ensure a long-term supply of industrial land.

[Section on Economics - Amended by Ordinance No. 889, passed by Council on June 14, 2016]

**Population:**

Land use plans change over time and the plan elements are updated at different points in time. Portland State University’s Population Research Center is charged by the State of Oregon with developing a population forecast for each city’s urban growth boundary (UGB) every four years, per Oregon Administrative Rules 660-032. The population forecast used in the City of Madras 2023-2043 Housing Capacity Analysis report (an appendix to this Comprehensive Plan) became official as of June 30, 2022. The next forecast will be finalized by June 30, 2026. ~~The demographic information included in this section of the plan was prepared in conjunction with an analysis to meet housing and residential land needs. Other demographic assumptions in the plan may differ from these depending on when they were prepared. When that is the case a separate table is included, which references the temporal difference from the planning assumptions presented below.~~

~~[The above paragraph added by Ordinance No. 918, Passed by Council on July 24, 2018.]~~

**Forecast Table**

~~Table 24 presents the population forecast for the City of Madras for the period 2005 to 2056. The forecast reaches a population of 13,115 by 2026, and of 27,997 by 2056.~~

~~The assumed growth rate for the 2006-2011 period is 4.5% annually. This rate is based on Madras' growth between 1980 and 2005, recent development activity and the impacts of the prison. The rate assumption is 4.0% annually for the 2011-2026 period. The assumed growth rate for the 2026-2056 period is 2.6% and is consistent with lower assumptions for the County during the later decades of the forecasting period.~~

**Table 24. Madras UGB Population Forecast, 2005-2030**

Year	Population	Annual Increase	Percent Change
<b>2005</b>	<b>5,592</b>	-	-
2006	5,844	252	4.5%
2007	6,107	263	4.5%
2008	6,381	275	4.5%
2009	6,669	287	4.5%
<b>2010</b>	<b>6,969</b>	<b>300</b>	<b>4.5%</b>
2011	7,282	314	4.5%
2012	7,574	291	4.0%
2013	7,876	303	4.0%
2014	8,192	315	4.0%
<b>2015</b>	<b>8,519</b>	<b>328</b>	<b>4.0%</b>
2016	8,860	341	4.0%
2017	9,214	354	4.0%
2018	9,583	369	4.0%
2019	9,966	383	4.0%
<b>2020</b>	<b>10,365</b>	<b>399</b>	<b>4.0%</b>
2021	10,779	415	4.0%
2022	11,211	431	4.0%
2023	11,659	448	4.0%
2024	12,125	466	4.0%
<b>2025</b>	<b>12,610</b>	<b>485</b>	<b>4.0%</b>
2026	13,115	504	4.0%
2027	13,451	336	2.6%
2028	13,795	344	2.6%
2029	14,148	353	2.6%
<b>2030</b>	<b>14,510</b>	<b>362</b>	<b>2.6%</b>
2031	14,882	371	2.6%
2032	15,263	381	2.6%
2033	15,653	391	2.6%
2034	16,054	401	2.6%
<b>2035</b>	<b>16,465</b>	<b>411</b>	<b>2.6%</b>
2036	16,887	422	2.6%
2037	17,319	432	2.6%
2038	17,762	443	2.6%
2039	18,217	455	2.6%
<b>2040</b>	<b>18,683</b>	<b>466</b>	<b>2.6%</b>
2041	19,162	478	2.6%
2042	19,652	491	2.6%
2043	20,155	503	2.6%
2044	20,671	516	2.6%
<b>2045</b>	<b>21,201</b>	<b>529</b>	<b>2.6%</b>
2046	21,743	543	2.6%
2047	22,300	557	2.6%
2048	22,871	571	2.6%
2049	23,456	585	2.6%
<b>2050</b>	<b>24,057</b>	<b>600</b>	<b>2.6%</b>
2051	24,673	616	2.6%
2052	25,304	632	2.6%
2053	25,952	648	2.6%
2054	26,616	664	2.6%
<b>2055</b>	<b>27,298</b>	<b>681</b>	<b>2.6%</b>
2056	27,997	699	2.6%

Source: Jefferson County Coordination Population Forecasts..ECONorthwest, April 2006

Note: 2057 population for Madras extrapolated using the 2.6% rate is 25,787

## Factual Base

The following sections provide factual evidence in support of the coordinated population forecast.

### Population Trends

Table 25 shows population estimates for Madras for the period between 1980 and 2005. The data show that Madras grew slowly during much of the 1980's, with population decreases some years. The City averaged about 3% growth annually, adding 660 people during this period. Madras' population began growing rapidly in 1989 and continued growing through the 1990's. Madras added 1,637 people in the 1990's, averaging 4% growth annually. Madras' population has continued to grow since 2000. Annexations account for a population increase of 681 people between 1980 and 2004. The majority of the growth in population resulting from annexation occurred in the 1980's. The largest annexation of 572 people took place in 1989, which explains the rapid growth in population in 1989.

**Table 25. Madras City Limit Population, 1980 to 2005**

Year	City of Madras	Annual Percent Change
<b>1980</b>	<b>2,235</b>	<b>-----</b>
1981	2,290	2.46%
1982	2,320	1.31%
1983	2,250	-3.02%
1984	2,260	0.44%
<b>1985</b>	<b>2,320</b>	<b>2.65%</b>
1986	2,340	0.86%
1987	2,270	-2.99%
1988	2,295	1.10%
1989	2,895	26.14%
<b>1990</b>	<b>3,443</b>	<b>18.93%</b>
1991	3,570	3.69%
1992	3,820	7.00%
1993	4,020	5.24%
1994	4,290	6.72%
<b>1995</b>	<b>4,675</b>	<b>8.97%</b>
1996	4,770	2.03%
1997	4,940	3.56%
1998	5,005	1.32%
1999	5,080	1.50%
<b>2000</b>	<b>5,078</b>	<b>-0.04%</b>
2001	5,200	2.40%
2002	5,290	1.73%
2003	5,370	1.51%
2004	5,430	1.12%
<b>2005</b>	<b>5,592</b>	<b>2.98%</b>

Source: U.S. Census and Population Research Center at Portland State University

The data in Table 25 includes only the population within the Madras UGB. The U.S. Census tracks the number of people within the city limits, as well as the population within the Madras urban cluster. According to the U.S. Census, an urban cluster is a densely settled territory that may or may not include a small incorporated city. In 2000, the Census estimated that there were 5,078 residents within the City of Madras and 7,252 people within the Madras urban cluster. The population living within Madras accounts for 70% of the population within the urban cluster.

Although the forecast for Madras does not include this group of people, the coordinated forecast for Jefferson County does include growth in this population.

Table 26 shows growth rates for Madras for several time periods. These historical growth rates provide context for developing a range of population projections. ECO calculated the rates using the compounding method. The data underscore several key points:

- The start and end dates have a big impact on the growth rate. This is because population growth was slow in the 1980's, then spiked in 1989 and 1990 and continued more gradually since 1991 to the present.

- The average annual growth rate (AAGR) was between 1.95% (2000-2005) and 4.50% (1985-2005) depending on the time period.

**Table 26. Compound Growth Rates by Time Period, City of Madras**

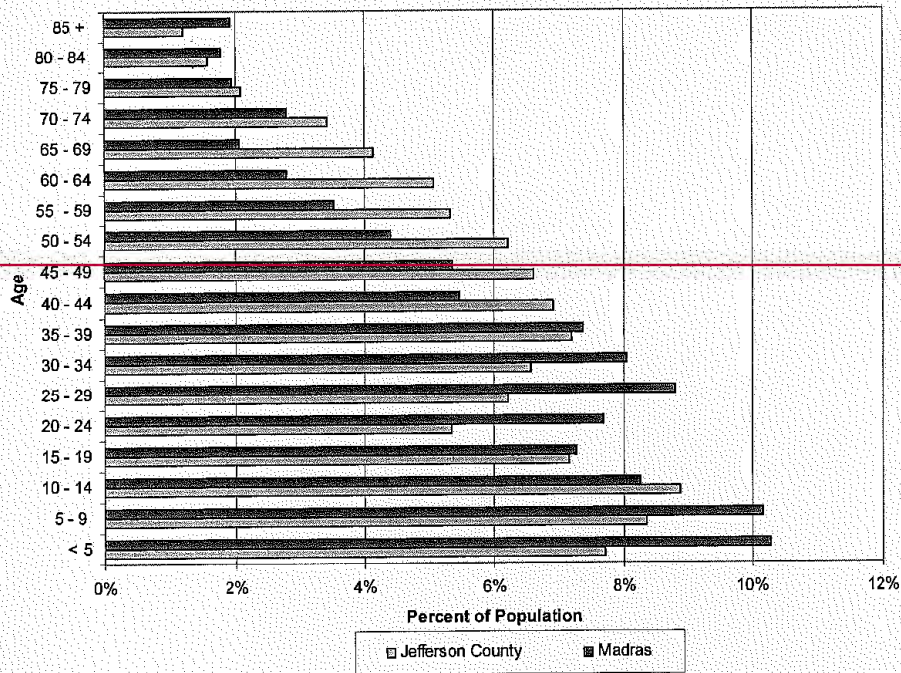
Period	Number of Years	AAGR (Compound Growth Rate)	Population Increase	% Change (Full Period)
1980-2005	25	3.74%	3,357	150%
1985-2005	20	4.50%	3,272	141%
1990-2005	15	3.29%	2,149	62%
1995-2005	10	1.81%	917	20%
2000-2005	5	1.95%	514	10%

### **Socioeconomic Trends**

This section reviews historical socioeconomic trends in the City of Madras. Socioeconomic trends provide a broader context for growth in a city; factors such as age, income, migration and other trends show how communities have grown and shape future growth. To provide context, the findings compare the City of Madras with Jefferson County. Characteristics such as age, household composition, and race are indicators of how population has grown in the past and provide insight into factors that may affect future growth.

Figure 7 compares age in the City of Madras and Jefferson County for 2000. The data show that Madras has more young and old residents than Jefferson County. Madras has a higher percentage of its population in the following age classes: 39 years and younger and 80 years and older. Madras has a lower proportion of its population in the 40 to 79 age ranges. These trends suggest that Madras is attracting younger people, including families with children.

**Figure 7. Age distribution, Madras and Jefferson County, 2000**



~~Source: U.S. Census, SF-1~~

~~During the 1990's Madras experienced changes in the age structure of its residents. Table 27 shows population by age for Madras for 1990 and 2000. The Census data show that Madras grew by 1,635 people between 1990 and 2000, which is a 47% increase. Madras experienced an increase in population for every age group. The fastest growing groups were 5 to 17 years and 45 to 64 years. The slowest growing groups were under 5 years, as well as 65 years and over.~~

~~A comparison of population increase by age between Madras and Jefferson County shows that:~~

- ~~● Madras grew faster than Jefferson County. The population of Madras increased by 47% between 1980 and 2000 and Jefferson County experienced a 39% population increase.~~
- ~~● Madras had a higher percentage increase in all age groups younger than 44 years. Madras had proportionately slower growth in age groups older than 45 years.~~

**Table 27. Population by Age, City of Madras 1990 and 2000**



1990			2000		Change		
Age Group	Number	Percent	Number	Percent	Number	Percent	Share
Under 5	395	11%	521	10%	126	89%	1%
5 - 17	688	20%	1,158	23%	470	114%	3%
18 - 24	366	11%	538	11%	172	100%	0%
25 - 44	1,020	30%	1,509	30%	489	100%	0%
45 - 64	496	14%	818	16%	322	112%	2%
65 and over	478	14%	534	11%	56	76%	-3%
Total	3,443	100%	5,078	100%	1,635	47%	0%

Source: U.S. Census, 1990 and 2000

The U.S. Census collects information about migration patterns. Specifically, it asks households where their residence was in 1995 (5 years prior to the Census count). Table 28 shows place of residence in 1995 for Madras and Jefferson County. The data show that residents of Madras are more mobile than residents of Jefferson County. Thirty-five percent of residents in Madras lived in the same residence in 1995, compared with 45% in Jefferson County. About one-third of residents in Jefferson County and Madras lived in a different county in 1995; about 16% of Madras residents lived in a different state in 1995. These trends indicate that migration is an important factor in Madras' past growth.

**Table 28. Place of Residence in 1995, Jefferson County and Madras Persons 5 Years and Over**

Location	Jefferson County		Madras	
	Persons	Percent	Persons	Percent
Population 5 years and older	17,610	100%	4,537	100%
Same house in 1995	8,007	45%	1,589	35%
Different house in 1995	9,603	55%	2,948	65%
Same county	3,976	23%	1,475	33%
Different county	5,450	31%	1,389	31%
Same state	3,520	20%	684	15%
Different state	1,930	11%	705	16%

Source: U.S. Census, SF 3

Table 29 shows the number of persons of Hispanic or Latino origin for Madras and Jefferson County for 1990 and 2000. The Census data show that Madras has a larger proportion of Hispanic/Latino population. In 2000, Madras' population was about 36% Hispanic/Latino, significantly higher than 18% in Jefferson County or 4% in Deschutes County. Madras' Hispanic/Latino population grew by 146% between 1990 and 2000. Madras' Hispanic/Latino population is growing faster than the overall population, which conforms to statewide trends. National demographic trends suggest this trend will continue in Madras.

**Table 29. Persons of Hispanic or Latino Origin  
City of Madras and Jefferson County, 1990 and 2000**

	Madras	Jefferson County
<b>1990</b>		
Total Population	3,443	13,676
Hispanic or Latino	739	1,448
Percent Hispanic or Latino	21.5%	10.6%
<b>2000</b>		
Total Population	5,078	19,009
Hispanic or Latino	1,815	3,372
Percent Hispanic or Latino	35.7%	17.7%
<b>Change 1990 - 2000</b>		
Hispanic or Latino	1,076	1,924
Percent Hispanic or Latino	146%	133%

Source: U.S. Census, SF-1, 1990-2000

### Summary of Findings

This section summarizes the findings in support of the alternative Madras population forecast.

#### **Madras has experienced substantial population growth since 1990.**

- Madras had a total of a 150% increase in population between 1990 and 2005. Between 1980 and 2005 the AAGR was 3.74%. The AAGR was 3.29% between 1990 and 2005. Madras' population growth slowed between 2000 and 2005, with an AAGR of 1.95%.

- Between 1990 and 2005 Madras grew more than twice as fast as Oregon and slightly faster than Jefferson County.

- The assumed growth rate of 4.5% annually for the 2006-2026 period is based on historical growth rates, recent development activity, and the impacts of the prison.

#### **Madras is attracting younger people, many of whom have children.**

- Madras has more young and old residents than Jefferson County. Madras has a higher percentage of its population in the following age classes: 39 years and younger and 80 years and older. Madras has a lower proportion of its population in the 40 to 79 age ranges. These trends suggest that Madras is attracting younger people, including families with children.

- Madras experienced changes in the age structure of its residents between 1990 and 2000. Madras experienced an increase in population for every age group. The fastest growing



groups were 5 to 17 and 45 to 64 years. The slowest growing groups were under 5 years, as well as 65 years and over.

### **~~In-migration accounts for some of the recent population growth.~~**

~~● Residents of Madras are more mobile than residents of Jefferson County. Thirty-five percent of residents in Madras lived in the same residence in 1995, compared with 45% in Jefferson County. About one-third of residents in Jefferson County and Madras lived in a different county in 1995; about 16% of Madras residents lived in a different state in 1995. These trends indicate that migration is an important factor in Madras' past growth.~~

### **~~Madras has the largest proportion of Hispanic/Latino residents in Jefferson County.~~**

~~● In 2000, Madras' population was about 36% Hispanic/Latino, significantly higher than 18% in Jefferson County, 4% in Deschutes County, or 8% for Oregon. Madras' Hispanic/Latino population grew by 146% between 1990 and 2000.~~

### **~~Several other factors justify a higher growth rate in the near term (2005-2026).~~**

~~● Madras is the least expensive housing market in Central Oregon. Lot prices are significantly lower in Madras; land is a significant contributor to overall housing prices. Development activity is increasing in Madras and Jefferson County - due in large part to more affordable housing. A proposed 1,700 unit master planned community in Madras provides evidence of this trend. This housing and land price differential will have a measurable impact on population increases in Jefferson County and its communities.~~

~~● Development proposals that are under review or have been approved suggest a lot of development is in the pipeline. For example, in March 2006 when this report was completed, Madras had over 3,000 single-family dwelling lots either platted or in process of submission for platting. Specifically, the east side development for Madras is planned for 1,700 units, plus commercial. A large Portland developer has submitted a proposal for 230 single-family dwelling units in Madras. These data suggest that Madras alone will average 70-75 new single-family dwellings annually in the 2007-2009 period and, more than 100 annually in the 2010-2020 period.~~

~~● The Community Impact Study estimates that the prison will have a direct population impact of 1,582 new persons in Madras. These individuals would be on top of any baseline growth projection.~~

~~In summary, rapid employment growth near Madras from the correctional facility, combined with new housing opportunities that have very competitive pricing and options, suggests that growth rates in Jefferson County and its cities will occur in the near term (the next 10 years) at rates higher than recent historical averages. The findings above support the assumed growth rate of 4.5% annually for the 2006-2011 period, of 4.0% for the 2011-2026 period, and of 2.7% annually for the 2026-2056 period.~~

~~[The population information in the revised Comprehensive Plan acknowledged by the DLCD on June 20, 2003 has been replaced with the above information as the result of passage of Ordinance No. 774 on August 22, 2006.]~~

~~[The City's Population Forecast was later amended, and adopted by reference, through the passage of City Ordinance No. 797 approved by the City Council on December 11, 2007, which included Exhibits "A" and "B" that revised the City's Population Forecast for the City's Comprehensive Plan.]~~

**Labor:**

The following tables summarize labor conditions in Madras. They are ~~from~~from the [Madras Economic Opportunities Analysis 2015 – 2035](#), [which provides information about existing employment in Madras](#).

~~Madras is relying on the safe harbor at OAR 660-024-0040(9)(a)(B), which allows Madras to assume that the current number of jobs in the Madras urban area will grow during the 20-year planning period at a rate equal to "the population growth rate for the urban area in the appropriate 20-year coordinated population forecast".~~

~~Madras is using the same growth rate used for its population forecast to project its employment growth. The average annual growth rate of population growth in the adopted forecast is 3.35% between 2015 and 2035; between 2035 to 2057 the average annual growth rate is 2.56%.~~

Sector	Covered Employment		Estimated Total Employment
	Number	% of Total Emp.	
Natural Resources and Mining	90	3%	111
Construction	24	1%	59
Manufacturing	823	24%	909
Wholesale	76	2%	88
Retail	444	13%	571
Transportation, Warehousing, & Utilities	20	1%	44
Information	22	1%	37
Finance & Insurance	69	2%	131
Real Estate Rental & Leasing	28	1%	156
Professional and Technical Services & Management of Companies	44	1%	54
Admin. Support & Cleaning Srv.	76	2%	149
Health Care & Social Assistance and Private Education	502	15%	679
Arts, Entertainment & Recreation	41	1%	77
Accomodations & Food Services	355	10%	392
Other Services (except Public Admin.)	111	3%	324
Government	712	21%	720
<b>Total</b>	<b>3,437</b>	<b>100%</b>	<b>4,501</b>

~~Estimated total employment in the Madras UGB by sector, 2013~~

~~Source: 2013 covered employment from confidential Quarterly Census of Employment and Wage (QCEW) data provided by the Oregon Employment Department. Covered employment as a percent of total employment calculated by ECONorthwest using data for Jefferson County employment from the U.S. Department of Commerce, Bureau of Economic Analysis (total) and the Oregon Employment Department (covered).~~

~~Employment growth in Madras UGB, 2015-2035; and 2035-2057~~

Year	Total Employment
2015	4,808
2035	9,292
2057	16,205
<b>Change 2015 to 2035</b>	
Employees	4,484
Percent	93%
AAGR	3.35%
<b>Change 2035 to 2057</b>	
Employees	6,913
Percent	74%
AAGR	2.56%

~~Source: ECONorthwest~~

~~Forecast of employment growth in by land use type, Madras UGB, 2015-2035 and 2035-2057~~

Land Use Type	2015		2035		2057		Change 2015 to 2035	Change 2035 to 2057
	Emp.	% of Total	Emp	% of Total	Emp	% of Total		
General Industrial	1,346	28%	2,416	26%	4,213	26%	1,070	1,797
Airport-Related Industrial	96	2%	372	4%	648	4%	276	276
Retail Commercial	625	13%	1,208	13%	2,107	13%	583	899
Non-Retail Commercial	1,731	36%	3,345	36%	5,834	36%	1,614	2,489
Government	1,010	21%	1,951	21%	3,403	21%	941	1,452
<b>Total</b>	<b>4,808</b>	<b>100%</b>	<b>9,292</b>	<b>100%</b>	<b>16,205</b>	<b>100%</b>	<b>4,484</b>	<b>6,913</b>

~~Source: ECONorthwest~~

~~Note: Green shading denotes an assumption by ECONorthwest~~

~~[The information in this section was amended by Ordinance No. 797 - Passed by City Council on December 11, 2007]~~

~~[Subsequently amended by Ordinance No. 889, passed by Council on June 14, 2016, which also removed obsolete sections related to Agriculture, Livestock, Manufacturing, Tourism, and Recreation]~~

**Housing:**

~~[The City of Madras 2023-2043 Housing Capacity Analysis report provides information about Madras housing market, demographic changes, and housing affordability and housing needs.](#)~~

~~The following City of Madras Housing Needs Analysis was completed in 2007 and adopted in the September 2007 in the Madras Urbanization Report.~~

~~This chapter provides the technical analysis to update the Housing (Goal 10) element of the Madras Comprehensive Plan. The City desires to determine the housing need for a 20- and 50-year planning horizon so that the UGB can be evaluated and designated Urban Reserve Areas can be considered. Statewide Planning Goal 10 addresses housing in Oregon and provides guidelines for local governments to follow in developing their local comprehensive land use plans and implementing policies.~~

~~At a minimum, local comprehensive plans and policies that address housing must meet the requirements of Goal 10. Goal 10 requires incorporated cities to complete an inventory of buildable residential lands and to encourage the availability of adequate numbers of housing units in price and rent ranges commensurate with the financial capabilities of all households.~~

~~Goal 10 defines needed housing types as “housing types determined to meet the need shown for housing within an urban growth boundary at particular price ranges and rent levels.” This definition includes not only government-assisted housing and mobile home or manufactured dwelling parks as provided in ORS and ORS 197.475 to 197.490, but housing needed for higher income families. For communities with populations greater than 2,500 and counties with populations greater than 15,000, needed housing types include (but are not limited to):~~

- ~~• Attached and detached single family housing and multiple-family housing for both owner and renter occupancy; and~~
- ~~• Manufactured homes on individual lots planned and zoned for single-family residential use.~~

~~Madras meets the population threshold for these statutory requirements; Goal 10 requires all incorporated cities to address housing need in their comprehensive plans. The housing needs analysis in this chapter addresses these housing types. Madras recently amended its comprehensive plan to emphasize that the City desires to balance its housing inventory to include all housing types. The amendment places an emphasis on providing housing types for families at all income levels, rather than only low and moderate income households. Specifically, the amendments recognize the need to provide housing that is suitable for higher-income residents.~~

~~In 1996, the Oregon legislature passed House Bill 2709 which is now codified as ORS 197.296. According to DLCD staff, Madras was *not* bound to the requirements of ORS 197.296 at the time this report was written. The City, however, is interested in assessing housing needs that are based on population forecasts that consider the affect of the Deer Ridge Correctional facility that is currently under construction.~~

## **METHODS**

~~While Madras is not required to comply with all provisions of ORS 197.296, ECONorthwest generally followed the methodology described in the DLCD report *Planning for Residential Development*, referred to as the “workbook.” The workbook generally describes seven steps in conducting a housing needs analysis:~~

- ~~1. Determine the number of new housing units needed in the next 20 years (and 50-years for urban reserves).~~
- ~~2. Identify relevant national, state, and local demographic trends that will affect the 20-year projection of structure type mix.~~
- ~~3. Describe the demographic characteristics of the population, and household trends that relate to demand for different types of housing.~~

4. Determine the types of housing that are likely to be affordable to the projected households.
5. Estimate the number of additional new units by structure type.
6. Determine the density ranges for all plan designations and the average net density for all structure types.
7. Evaluate unmet housing needs and the housing needs of special populations (Goal 10 and Goal 14 needs).

The remainder of this chapter is organized into three sections. The first section describes residential development trends in Madras, the second describes demand for new housing units over the 20-year planning period; and the third addresses housing needs.

## RESIDENTIAL DEVELOPMENT TRENDS

An evaluation of recent development trends is useful in developing a better understanding of development trends in the local housing market. Table 4-1 shows dwelling units by type in Madras in 1990 and 2000 as reported by the Census. According to the Census, Madras had 1,374 dwelling units in 1990 and 1,927 dwelling units in 2000—an increase of 553 dwelling units. Notably, Madras added 207 single-family detached units during this period, 236 multiple family units, and 86 mobile/manufactured units. The percentage of single-family detached dwelling units decreased from 50% in 1990 to 46% in 2000. The Census data suggest that housing development in Madras during the 1990s was a combination of housing types. The City added housing types that are affordable to lower income households (single-family attached, multifamily, mobile/manufactured) at comparable or faster rates than conventional single-family detached units. As evidenced by the recent amendments to the comprehensive plan, the City seeks to balance the housing types that are available.

**Table 4-1. Dwelling units by type, Madras City Limit, 1990 and 2000**

Housing Units	1990 Census		2000 Census		New DU 1990-2000	
	Number	Percent	Number	Percent	Number	% Change
Single-family detached	686	49.9%	893	46.3%	207	30%
Single-family attached	33	2.4%	57	3.0%	24	73%
Multiple family	371	27.0%	607	31.5%	236	64%
Mobile/Manufactured	284	20.7%	370	19.2%	86	30%
<b>Total housing units</b>	<b>1,374</b>	<b>100.0%</b>	<b>1,927</b>	<b>100.0%</b>	<b>553</b>	<b>40%</b>

Source: US Census of Population and Housing

Table 4-2 shows building permits issued for new residential construction in Crook, Deschutes and Jefferson counties annually between 2001 and September 2005. The data show that Deschutes County has historically accounted for the majority of single-family development in the region. Crook and Jefferson counties, however, are accounting for an increasing share of single-family residential development. This “spill-over” from Deschutes County to Crook and Jefferson counties is expected to continue. The number of single family permits increased 40% in the region between



2001 and 2005. The number of permits issued in Crook and Jefferson counties is growing faster than the number issued in Deschutes County.

**Table 4-2. Single-family building permits issued in Crook, Deschutes, and Jefferson Counties, 2001-September 2005**

Year	Crook County		Deschutes County		Jefferson County		Central Oregon Total
	Number	% of Total	Number	% of Total	Number	% of Total	
2001	67	2.2%	2,828	94.5%	97	3.2%	2,992
2002	78	2.6%	2,874	94.5%	90	3.0%	3,042
2003	123	4.8%	2,364	91.5%	98	3.8%	2,585
2004	142	4.3%	3,074	92.8%	98	3.0%	3,314
2005	170	4.0%	3,763	89.8%	265	6.3%	4,198
Increase 2001-2005							
Number	103		935		168		1,206
Percent	153.7%		33.1%		173.2%		40.3%

Source: Crook, Deschutes, and Jefferson County Planning Departments.

Another trend in Central Oregon is the continued growth of high quality housing that is supported by a variety of neighborhood amenities. The trend includes housing in destination resorts and planned communities for year-round living. In Oregon, a destination resort is defined as a self-contained development providing visitor-oriented accommodations and developed recreational facilities in a setting with high natural amenities (Statewide Planning Goal 8). Moreover, a destination resort must be at least 160 acres in area and have at least 50% of the area committed to open space. Examples of new destination resorts include Hidden Canyon, Remington Ranch and Brasada Ranch in Crook County, and Eagle Crest and an expansion of Sunriver in Deschutes County.

Developments with qualities similar to destination resorts, but that are intended for full-time residents, are also an emerging trend in Central Oregon. Bend and Prineville each include master planned communities that include a variety of housing types that are governed by CC&Rs that include design guidelines in CC&Rs that ensure that homes are high quality. The communities also have neighborhood amenities such as generous parks, open spaces and walking/biking trails, school sites and home sites with views. Both Ironhorse (in Prineville) and NorthWest Crossing (in Bend) also include "Main Street" neighborhood commercial centers.

The master planned communities are extremely desirable and have raised the bar for what is required in order to capture high-end households. These master planned communities offer residents convenient access to social and recreational activities, ample open space and the assurance that the quality of the community will stay high based upon the type of homes being constructed and CC&Rs that will maintain the quality of the neighborhood in perpetuity. National survey research helps explain why high-income buyers are choosing to live in master planned communities with amenities. A statistically valid survey of buyer preferences shows that high-income homebuyers rate communities with open space and amenities as extremely important when choosing where to live.<sup>7</sup> Specifically, these households indicate that communities with architectural consistency, ample open space and access to recreational and social amenities within the community are "very" or "extremely" important to high-income households when choosing where to live.

~~Simply building a large home on a large lot does not satisfy the needs of consumers that have master planned communities such as Ironhorse and NorthWest Crossing as alternatives. Large homes on large lots are not as desirable for a number of reasons. First, the quality of the neighborhood in a master planned community is consistent based on the type of homes built~~

~~within the community and guaranteed to remain desirable based on deeded CC&Rs. Conversely, the value of a large custom home can be impacted by any neighbor who chooses to construct an inferior structure, poorly maintains their home and property or stores vehicles or materials outdoors. Second, single large homes on large lots do not have access to a variety of recreational amenities within the community. Finally, independent large homes on large lots do not have access to planned social activities within the community such as golf groups, golf tournaments, neighborhood gatherings, and formal dinners and other social activities at a community center or clubhouse.~~

~~Madras does not have any neighborhoods of this type. While Madras has a diversity of neighborhoods and housing types, it does not have any neighborhoods that integrate all of the elements discussed above.~~

~~An analysis of density is also helpful in evaluating development trends. Table 4-3 shows average residential density for single-family units by zone in Madras. The GIS data provided by Jefferson County did not include year built data so it was not possible to analyze density for any specific time period. Moreover, the GIS data did not include data that allowed evaluation of multi-family density.~~

~~Despite these limitations, the data in Table 4-3 provides useful information on housing density. The data indicate that Madras has an average single-family residential density of 3.0 dwelling units per net acre. The data also show that average densities differ by zone, with the R-1 zone having the lowest average) density (2.3 dwelling units per net residential acre), and the R-3 zone having the highest average density (6.4 dwelling units per net residential acre).~~

**Table 4-3. Net density of single-family housing, Madras UGB**

Zone	Number of Dwellings	Net Acres	Net Density
Single Family Residential (R1)	867	369.3	2.3
Multiple Family Residential (R2)	499	103.5	4.8
Mixed Residential (R3)	56	8.7	6.4
Total/Average	1,422	481.5	3.0

Source: Jefferson County GIS data; analysis by ECNorthwest

### **NEW DWELLING UNITS NEEDED, 2007-2027 AND 2007-2057**

~~Estimating total new dwelling units needed during the planning period is a relatively straightforward process. Demand for new units is based on the county coordinated population forecast as required by ORS 195.036 and ORS 197.296. Persons in group quarters are then subtracted from total persons to get total persons in households. Total persons in households is~~

divided by persons per household to get occupied dwelling units. Occupied dwelling units are then inflated by a vacancy factor to arrive at total new dwelling units needed.

The following sections step through that logic and describe the basis for the assumptions applied to the estimate of demand for new dwelling units.

## POPULATION

Table 4-4 and Figure 4-1 shows historical and forecast population for Madras between 1980 and 2057. The 2000 Census indicates Madras's population was 5,078 persons. According to the Population Research Center at Portland State University, population increased to 5,592 in 2005 and increased to 6,070 in 2006. The coordinated population forecast assumes an average annual growth rate of 4.1% for the City of Madras for the 2007-2027 period. Madras's 2027 population forecast (e.g., the 20-year forecast) is 13,451 persons. This represents an increase of 7,437 persons between 2007 and 2027.

The population forecasts also included a 50-year forecast. The County and cities included a 50-year forecast because Madras is interested in the establishing urban reserve areas (URAs) consistent with OAR 660-021. The city can include up to a 50-year land supply within urban reserve areas. The population forecast indicates Madras will have a population of 28,725 persons in 2057. This is an increase of 22,711 persons over the 2007 population.

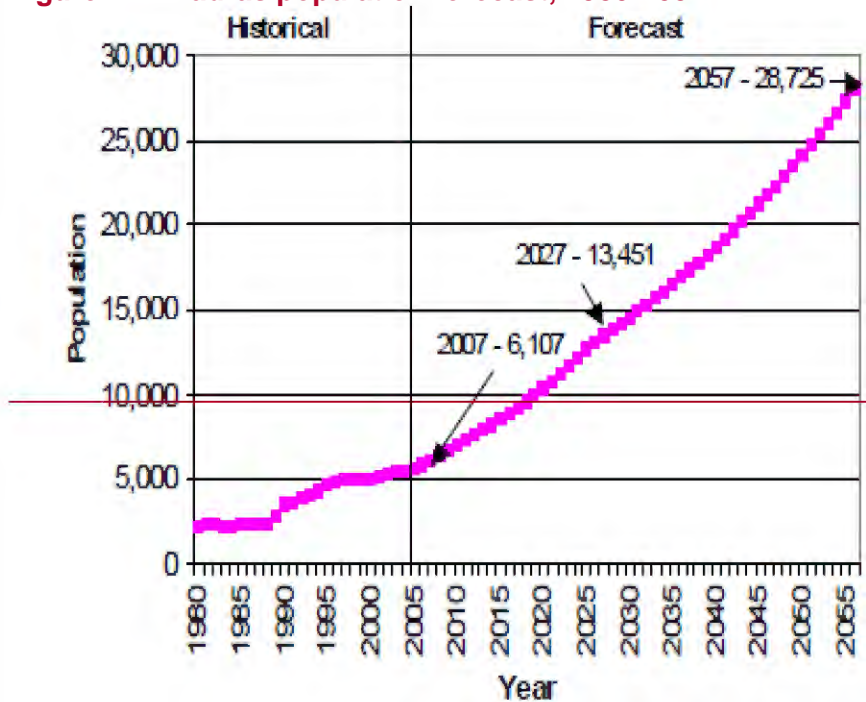
**Table 4-4. Historical and forecast population, City of Madras, 1980-2057**

Year	Population	Change		
		Number	Percent	AAGR
1980	2,235	-	-	-
1985	2,320	85	3.8%	0.7%
1990	3,443	1,123	48.4%	8.2%
1995	4,675	1,232	35.8%	6.3%
2000	5,078	403	8.6%	1.7%
2005	5,592	514	10.1%	1.9%
2007	6,107	-	-	-
2010	6,969	1,377	24.6%	4.5%
2015	8,519	1,551	22.3%	4.1%
2020	10,365	1,846	21.7%	4.0%
2025	12,610	2,246	21.7%	4.0%
2027	13,451	-	-	-
2030	14,510	1,900	15.1%	2.8%
2035	16,465	1,955	13.5%	2.6%
2040	18,683	2,218	13.5%	2.6%
2045	21,201	2,517	13.5%	2.6%
2050	24,057	2,856	13.5%	2.6%
2055	27,298	3,241	13.5%	2.6%
2057	28,725	-	-	-

Source: Jefferson County Coordinated Population Forecasts, January 2008



**Figure 4-1. Madras population forecast, 1980-2057**



Source: Jefferson County Coordinated Population Forecasts

### **PERSONS IN GROUP QUARTERS**

Persons in group quarters do not consume standard housing units: thus, any forecast of new people in group quarters is typically backed out of the population forecast for the purpose of estimating housing demand. Group quarters can have a big influence on housing in cities with colleges (dorms), prisons, or a large elderly population (nursing homes). In general, one assumes that any new requirements for these housing types will be met by institutions (colleges, government agencies, health-care corporations) operating outside what is typically defined as the housing market. Group quarters, however, require land and are typically built at densities that are comparable to multiple-family dwellings.

According to Census data, 80 persons resided in group quarters in 2000 in Madras. Of those 80, 38 were in nursing homes, 19 in correctional facilities, and 23 in other non-institutionalized group quarters. The key area where one would expect changes in group quarters are in nursing homes. Consistent with the overall aging of the population, this analysis expects persons in nursing homes to increase at a faster rate than the overall population.

Approximately 1.6% of the city's population resided in group quarters in 2000. Of this, about 0.8% were in nursing homes. Our evaluation is that persons in correctional facilities will not increase substantially (the Deer Ridge facility is outside the Madras UGB) and that persons in non-institutionalized group quarters will not increase substantially. Thus, it is reasonable to assume that 1% of the new population added between 2007 and 2057 will be in group quarters.

## **AVERAGE HOUSEHOLD SIZE**

In the 1980s, traditional families (married couple, with one or more children at home) accounted for 29% of all households in Oregon. In 1990 that percentage had dropped to 25%; which further decreased to 23% in 2000. It will probably continue to fall, but not as dramatically. Moreover, the average household size has decreased over the past five decades and is likely to continue decreasing. The average household size in Oregon was 2.60 in 1980, 2.52 in 1990, and 2.51 in 2000. The direct impact of decreasing household size on housing demand is that smaller households means more households, which means a need for more housing units.

Unlike national and state trends, household sizes in Madras increased from 2.61 in 1990 to 2.81 in 2000. This increase is somewhat inconsistent with changes in housing types during the 1990s. The City added more multifamily dwellings than single-family. Multifamily dwellings typically have substantially lower average household sizes than single-family (for example, in 2000 in Madras the average single-family household size was 2.95 persons; the average multifamily household size was 2.66). The increase may be related to the increase in Hispanic population; about 22% of Madras residents were Hispanic in 1990; this increased to 36% in 2000. Hispanic households are typically larger than other ethnic groups (in 2000, the average household size in Madras for Hispanic households was 3.90 compared to 2.36 for White households).

The City's existing comp plan includes a 1998-2018 population projection that estimates the average household size to be 2.37 persons—a figure considerably lower than the Census figures. The development of the prison and the expected increase in higher income households, provide strong evidence that average household sizes will decrease over the planning period. This study assumes an average household size of 2.75 persons for owner-occupied units and of 2.40 for renter-occupied units.

## **VACANCY RATES**

Vacant units are the final variable in the basic housing demand model. Vacancy rates are cyclical and represent the lag between demand and the market's response to demand in additional dwelling units. Analysts consider a 2%-4% vacancy rate typical for single-family units; 4%-6% is typical for multifamily residential markets. In 1990, the overall vacancy rate in Madras was 7.5%. According to the 2000 Census, about 7% of single-family housing in Madras was vacant and 14% multiple family housing was vacant. This study uses 5.0% as a base assumption for single-family units and 9.0% as a base assumption for multiple family units. These figures are reasonable considering they are lower than vacancies recorded by the 2000 Census and average to a rate comparable to the 1990 Census.

## **FORECAST OF NEW HOUSING UNITS, 2007-2027 AND 2007-2057**

The preceding analysis leads to a forecast of new housing units likely to be built in the Madras for the periods 2007-2027 and 2007-2057. Table 4-5 summarizes the analysis. Based on the assumptions shown in Table 4-5, Madras will need 2,936 new dwelling units to accommodate population growth between 2007 and 2027 and 9,042 new dwelling units to accommodate growth

~~between 2007 and 2057. The forecast assumes 72% will be single-family housing types (single-family detached and manufactured) and 28% will be multifamily.~~

~~The forecast of new units does not include dwellings that will be demolished and replaced. This analysis does not factor those units in; it assumes they will be replaced at the same site and will not create additional demand for residential land.~~

~~**Table 4-5. Demand for new housing units, Baseline Assumptions Madras, 2007-2027 and 2007-2057**~~

Variable	Baseline Estimate of Housing Units (2007-2027)	Baseline Estimate of Housing Units (2007-2057)
Change in persons, 2007-2027; 2007-2057	7,344	22,618
-Change in persons in group quarters	73	226
=Persons in households	7,271	22,392
<b>Single-family dwelling units</b>		
Percent single-family DU	72%	72%
Persons in single-family households	5,235	16,122
+Persons per occupied single family DU	2.75	2.75
New occupied single-family DU	1,904	5,863
Vacancy rate	5.0%	5.0%
Total new single-family DU	2,004	6,171
<b>Multiple family dwelling units</b>		
Percent multiple family DU	28%	28%
Persons in multiple-family households	2,036	6,270
+Persons per occupied multiple family DU	2.40	2.40
New occupied multiple-family DU	848	2,612
Vacancy rate	9.0%	9.0%
New multiple family DU	932	2,871
<b>Totals</b>		
=Total new occupied dwelling units	2,752	8,475
Aggregate household size (persons/occupied DU)	2.64	2.64
+ Vacant dwelling units	184	567
=Total new dwelling units	2,936	9,042
Dwelling units needed annually	147	181

Source: Calculations by ECONorthwest based on County population forecasts and US Census data.

## **HOUSING NEEDS ANALYSIS**

~~The DLCD Workbook describes five steps in analyzing housing needs in a community. Specifically, these steps are:~~

- ~~1. Identify relevant national, state, and local demographic and economic trends and factors that may affect the 20-year and 50-year projection of structure type mix.~~
- ~~2. Describe the demographic characteristics of the population and, if possible, housing trends that relate to demand for different types of housing.~~

- ~~3. Determine the types of housing that are likely to be affordable to the projected households based on household income.~~
- ~~4. Estimate the number of additional needed units by structure type.~~
- ~~5. Determine the needed density ranges for each plan designation and the average needed net density for all structure types.~~

~~The remainder of this section is organized around this five-step process.~~

### ~~**STEP 1. IDENTIFY RELEVANT NATIONAL, STATE, AND LOCAL DEMOGRAPHIC AND ECONOMIC TRENDS AND FACTORS THAT MAY AFFECT THE 20-YEAR PROJECTION OF STRUCTURE TYPE MIX**~~

~~The first step in a housing needs assessment is to identify relevant national, state, and local demographic and economic trends and factors that affect local housing markets. The evaluation that follows is based on previous research conducted by ECONorthwest for other housing needs studies as well as new research to update the evaluation of trends that may affect housing mix. Previous work by ECO and conclusions from *The State of the Nation's Housing, 2005* report from the Joint Center for Housing Studies of Harvard University inform the national, state, and local housing outlook for the next decade. The Joint Center for Housing Studies of Harvard University's *The State of the Nation's Housing, 2005* report summarizes the national housing outlook for the next decade as follows:~~

~~"In 2004, many households rushed to take advantage of still attractive interest rates and buy in advance of potentially higher prices. As a result, homeownership posted an all-time high of 69 percent last year, with households of all ages, races, and ethnicities joining in the home-buying boom.~~

~~House prices, residential investment, and home sales all set records again in 2004. But higher short-term interest rates and the strongest one-year price appreciation since 1979 made it more difficult for first-time buyers to break into the market. With low-wage jobs increasing and wages for those jobs stagnating, affordability problems will persist even as strong fundamentals lift the trajectory of residential investment."~~

~~While this presents a relatively optimistic outlook for housing markets and for homeownership, it points to the significant difficulties low- and moderate-income households face in finding affordable housing. The following sections describe specific trends in more detail.~~

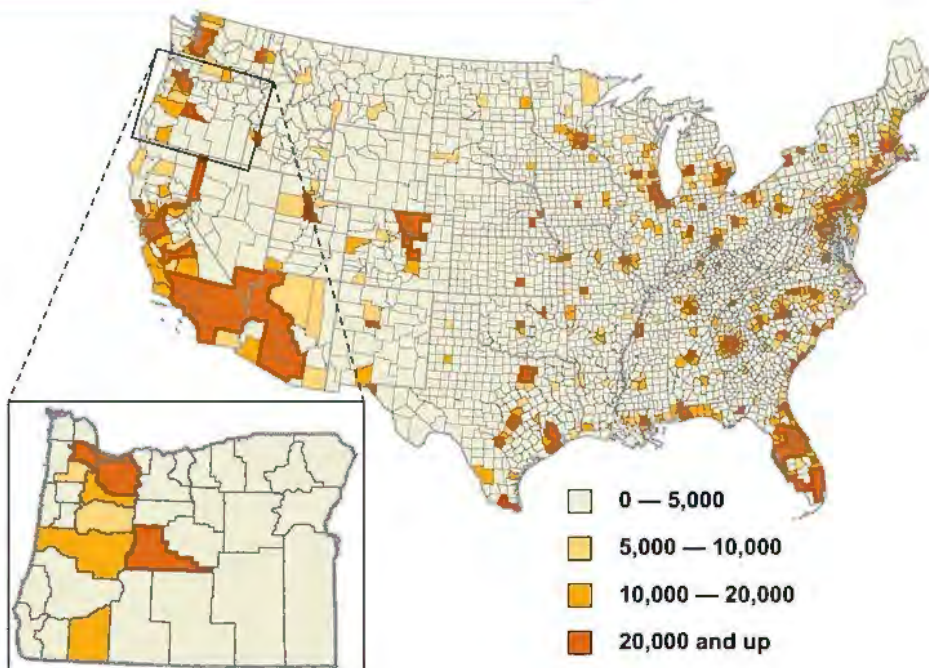
#### ~~Trends in home ownership and demand~~

~~As quoted above, in 2004, many households took advantage of still attractive interest rates and to buy in advance of potentially higher prices. As a result, homeownership increased to an all-time high of 69% in 2004, with households of all ages, races, and ethnicities participating in the home buying boom. House prices, residential investment, and home sales all set records in 2004. Regionally, using housing permits issued as a proxy for new home ownership, Jefferson County is among the smaller housing markets in the nation and in Oregon, issuing less than 5000 building permits over the 1994-2003 period (see Figure 4-2).~~



However, as demonstrated in Table 4-2, from 2001-2005 single family home building permits issued in Jefferson County increased by 173.2%.

**Figure 4-2. Housing permits issued by county, U.S., 1994-2003**



Source: Census Bureau, Construction Statistics, Building Permits by County. As cited in *The State of The Nation's Housing, 2005*, The Joint Center for Housing Studies of Harvard University, p. 9

#### Demographic trends in home ownership

According to the Joint Center for Housing Studies, an aging population, and of baby boomers in particular, will drive changes in the age distribution of households in all age groups over 55 years. Baby boomers, however, do not appear to be in a rush to downsize. While more than half of the oldest boomers (aged 45 to 54 in 2000) moved during the 1990s, they typically traded up to newer homes with more amenities.

Current national demographic trends are creating unprecedented demand for second homes and, to a lesser degree, retirement housing. The trends are related to the aging and increasing wealth of the baby boomer populations. While the leading edge of the baby boom population is still a few years from retirement, in mass numbers, this demographic group is at least getting ready for retirement and deciding where they want to spend their golden years. There is a strong demand for pre-retirement second homes that will eventually become permanent residents.

A segment of the baby boomers, and retirees, are attracted to communities with recreational and social amenities. These so called "active adult retirement communities," which are not necessarily age restricted, share qualities with destination resorts and master planned communities in the area. Neighborhoods that are desirable to active retirees include a variety of housing types of a relatively high quality, and frequently a golf course (with its recreational and social opportunities) is the centerpiece of the neighborhood.

Another trend in home ownership is the surge of households of all age ranges purchasing second homes. There are two significant second home destinations in Oregon; Central Oregon and the Oregon Coast. Central Oregon has over a dozen large-scale destination resort communities, all of which include at least one 18-hole golf course. Most also have other recreational amenities, such as tennis courts, swimming pools and open space with nature trails. All have restrictive covenants ensuring that housing is built to certain aesthetic standards. Most of these resorts, particularly the newer ones, are positioned to target the highest end of the market, in terms of income and wealth. As a result, developments with qualities similar to destination resorts, such as master-planned communities like NorthWest Crossing and Ironhorse, are more affordable alternatives for second home buyers.

Central Oregon has been exceptionally popular for baby boomers, retirees and second home buyers. The region has a variety of recreational amenities (both natural and developed), a different climate than the metro areas in the Willamette Valley, and a range of housing choices that are attractive to these housing segments. Madras and Jefferson County have not experienced as much growth in these housing segments as Deschutes and Crook County, but it is ideally located to do so because it is much closer to Portland than other Central Oregon communities. If appropriate housing choices are available, Madras could become attractive to baby boomers, retirees and second home buyers, and experience the economic benefits associated with these housing segments.

#### Long-run demographic trends in home ownership

Nationally, the Joint Center for Housing Studies suggests that immigration will play a key role in accelerating household growth over the next 10 years. Between 1991 and 2003, the minority share of first-time homebuyers increased from 22 percent to 35 percent, of new homebuyers from 13 percent to 24 percent, and of home remodelers from 12 percent to 19 percent. The children of immigrants who arrived in the 1980s and 1990s now account for 21 percent of children between the ages of 1 and 10, and 15 percent of those between the ages of 11 and 20. Members of this generation will probably earn more than their parents and become an even greater source of housing demand in the coming decades. Given Madras' large Hispanic population, this national trend means that Madras can expect an increased housing demand.

#### Characteristics of housing units

ECONorthwest reviewed data from the U.S. Bureau of Census *Current Construction Reports* to identify national, state, and local trends in the characteristics of new housing. From the *Current Construction Report*, several trends in the characteristics of housing are evident:

- *Larger single-family units on smaller lots.* Between 1994 and 2004 the median size of new single-family dwellings increased 14%, from 1,900 sq. ft. to 2,169 sq. ft. nationally and 17% in the western region from 1,810 sq. ft. to 2,126 sq. ft. Moreover, the percentage of units under 1,200 sq. ft. nationally decreased from 5% in 1999 to 3% in 2004. The percentage of units greater than 3,000 sq. ft. increased from 16% in 1999 to 21% of new one-family homes sold in 2004. In addition to larger homes, a move towards smaller lot sizes is seen

nationally. Between 1994 and 2004 the percentage of lots less than 7,000 sq. ft. increased 6% from 29% of lots to 35% of lots. A corresponding 6% decrease in lots over 11,000 sq. ft. is seen. Although Madras is an urban city, the lifestyle and values of its residents translates into larger lot sizes than are found in cities in the Portland metropolitan region. For example, the average lot size for single family dwellings in Madras is about 13,000 square feet.

- *Larger multifamily units.* Between 1994 and 2004, the median size of new multiple family dwelling units increased. The percentage of multifamily units with more than 1,200 sq. ft. increased from 11% to 34% in the western region and from 11% to 38% nationally. Moreover, the percentage of units with less than 600 sq. ft. decreased from 6% to 4% in the western region and from 4% to 3% nationally, while
- *More household amenities.* Between 1994 and 2004 the percentage of single-family units built with amenities such as central air conditioning, fireplaces, brick exteriors, 2 or more car garages, or 2 or more baths all increased. The same trend in increased amenities is seen in multiple family units.

#### Other regional and local trends

#### Housing with Neighborhood Amenities, Including Destination Resorts and Master Planned Communities

A trend in Central Oregon is the continued growth of high quality housing that is supported by a variety of neighborhood amenities. The trend includes housing in destination resorts and planned communities for year-round living.

In Oregon, a destination resort is defined as a self-contained development providing visitor-oriented accommodations and developed recreational facilities in a setting with high natural amenities (Statewide Planning Goal 8). Moreover, a destination resort must be at least 160 acres in area and have at least 50% of the area committed to open space. Black Butte Ranch, Crooked River Ranch, and Sunriver were among the earliest destination resorts. More recently, both Sunriver and Eagle Crest have experienced expansions, and the region has several new and proposed resorts. Roger Lee at Economic Development for Central Oregon identified the following new destination communities:

- Brasada Ranch – 1800 acres with 900 single family units and 1 golf course on the western slopes of Powell Butte, in Crook County. Eagle Crest Resort, just outside the city of Redmond on 1700 acres with 3 golf courses.
- A 400 home expansion of Sunriver (Sunriver has 3 golf courses)
- Remington Ranch, a proposed destination resort in Crook County that will be approximately 2,080 acres with 800 single family units and 3 golf courses; and
- Hidden Canyon, another proposed destination resort in Crook County that is expected to be 3,243 acres with approximately 2,450 single family dwellings and 1 golf course

~~Developments with qualities similar to destination resorts, but that are intended for full-time residents, are also an emerging trend in Central Oregon. Bend and Prineville each have master-planned communities that include a variety of housing types that are governed by deeded CC&Rs that include design guidelines that ensure that homes are constructed and maintained at a high quality. The communities also have neighborhood amenities such as generous parks and open spaces, walking/biking trails, school sites and home sites with views. Both Ironhorse (in Prineville) and NorthWest Crossing (in Bend) also include "Main Street" neighborhood commercial centers.~~

~~Master-planned developments typically require larger sites. For example, Ironhorse in Prineville is located on a 186-acre site. NorthWest Crossing in Bend is on a 472-acre site. Each of these developments provides a mix of housing types and prices. Single-family dwellings account for about two-thirds of the housing and prices range from around \$200,000 to over \$350,000. In short, master-planned developments are not possible without large sites.~~

~~The master-planned communities are extremely desirable and have raised the bar for what is required in order to capture high-end households. These master-planned communities offer residents convenient access to social and recreational activities, ample open space and the assurance that the quality of the community will stay high based upon the type of homes being constructed and CC&Rs that will maintain the quality of the neighborhood in perpetuity. National survey research helps explain why high-income buyers are choosing to live in master-planned communities with amenities. A statistically valid survey of buyer preferences shows that high-income homebuyers rate communities with open space and amenities as extremely important when choosing where to live. Simply building a large home on a large lot does not satisfy the needs of consumers that have master-planned communities such as Ironhorse and NorthWest Crossing as alternatives.~~

~~These amenity-oriented developments underscore a Central Oregon trend towards destination resorts and master-planned communities. Such developments typically serve three markets: (1) primary housing for families; (2) primary housing for active retirees; and (3) the second-home market. The Deer Ridge Correctional Institution will create demand for primary housing for families (a section below describes demand derived from the correctional facility in more detail).~~

~~Madras does not currently have any comparable developments. Madras has, however, taken steps to position itself to better compete with the high-end housing with amenities that is being developed in nearby communities. The recently adopted comprehensive plan policies and Master Planned Community overlay encourage development that will increase the desirability and livability of Madras. For example, a project developed under the new overlay zone will be required to provide generous open space (at least 30% of the site area) and is encouraged to provide a mix of housing types and abundant amenities such as active and passive recreational opportunities.~~

~~When a variety of housing types (including housing types that are commensurate with all income levels) are represented in a community, workers need not leave the community where they work to find the needed housing type of their choice. Thus, a community is able to attract a variety of people, creating diversity of citizenship and a diverse tax base. Conversely, the failure of a community to provide land for needed housing types cause communities to fail to maintain its work force, fail to attract business, fail to achieve or maintain diversity of citizenship, unnecessarily burdens social services (or conversely burdens social services in other communities), and~~



~~contributes unnecessary vehicle miles traveled outside of the community to find needed housing types.~~

~~When a community fails to provide an adequate amount of land for higher income households, for example, demographics may be created that place a disproportionate burden on social services, without the attendant tax base to support the provision of such services.~~

### ~~Housing values in Central Oregon~~

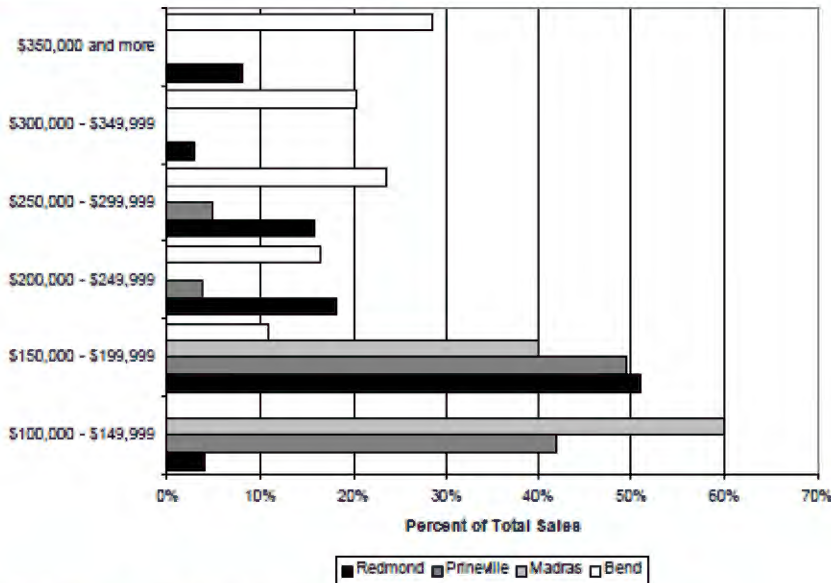
~~Housing cost is one of several factors that influence households' choices about where to live. It is difficult to separate cleanly the reasons that individual households and firms make location and structure choices from the reasons that urban areas grow: an urban area grows because households and businesses make decisions to locate there.~~

~~The choice between location and structure, and the geographic level of location choice, also overlap. It is probably reasonable to assume that for most firms and businesses, the decision about a regional location comes first: what state or metropolitan area is most desirable? Having made that choice, households and businesses then make a more specific (intra-regional) location choice based on some similar, and some different or more detailed, criteria. For example, a household may move to central Oregon primarily for a job opportunity such as the Deer Ridge Correctional Institution (and the general quality of life benefits of central Oregon). But once that decision is made, it then considers things like community, school districts, lot size, housing price, housing amenities, and proximity to work and shopping locations. The literature on housing recognizes this point, making a distinction between the mobility choice (what region to live in) and the housing choice (type, tenure, cost, and amenities of housing, and sub-area to locate in). The City recognized the need to provide housing choices that attract relocating workers (and people that are already in the community) by amending its comprehensive plan and zoning code to include the Master Planned Community overlay zone, which is a planning tool that will provide a variety of housing types and price ranges with amenities. The importance of providing housing choices with neighborhood amenities is discussed above.~~

~~The literature suggests that different households place different relative weights on site and structure characteristics in housing location choice. Based on a household survey, Wachs, et. al. (1993) concluded "...commuting distance is likely to be a secondary consideration in choosing where to live; housing costs, quality of schools, and safety from crime were anticipated to generally to play a much larger role."~~

~~Housing costs in Deschutes and Jefferson Counties vary, depending in part on the proximity to Bend. Figure 4-3 shows the percent of new homes built and sold in 2005 for Prineville, Redmond, and Bend. Homes in Bend are the most expensive, with more than 40% of homes having a sales price of \$300,000 or greater and none recorded for less than \$150,000. About three-quarters of new homes in Redmond sold for \$150,000 to \$249,999. New homes in Prineville were the least costly and generally sold for less than \$200,000. Madras was the most affordable market—60% of homes sold in 2005 in Madras sold for less than \$150,000. Prineville is approximately 36 miles from Bend and Madras is approximately 43 miles from Bend. Because the two cities are roughly equidistant from Bend, the disparity in housing prices are likely due more to the quality of the housing stock than proximity to Bend.~~

**Figure 4-3. Percent of new homes built and sold in 2005, grouped by sales price for Prineville, Redmond, Bend, and Madras**



Source: Multiple Listing Service (MLS), 2008

MLS data also show a rapid increase in sales prices between 2004 and 2005 (see Table 4-6). The average sales price in Bend increased nearly 16% between 2004 and 2005; Redmond's increase was nearly 25%, while Prineville's increase was nearly 32%. The rapid increase in housing costs in Bend has caused households to look to first Redmond and then Prineville for more affordable housing. Moreover, lot prices are significantly lower in Madras. In 2005, the average subdivision lot in Madras sold for about \$32,000. This compares favorably with Bend (\$150,000), Redmond (\$90,000), and Prineville (\$58,000). The data clearly indicate that land costs in Madras are significantly less than Bend, Redmond or Prineville. Recent development trends in Jefferson County suggest that households will begin seeking more affordable housing options in the County which will result in higher population growth rates. Additionally, if housing with amenities is made available in Madras, particular if it is more affordable than housing in the surrounding area, then households will be attracted to Madras at increased rates. This is consistent with the City's community development objectives and is factored into this housing needs analysis.

**Table 4-6. Distribution of new home sales prices for selected subdivisions in Central Oregon cities, 2004 and 2005 Bend, Redmond, Prineville, Madras**

	Bend	Redmond	Prineville	Madras
<b>Number of Sales</b>				
2004	349	229	64	3
2005	487	341	86	21
<b>Average Sales Price</b>				
2004	\$253,291	\$176,152	\$127,603	\$133,167
2005	\$293,487	\$219,544	\$168,051	\$153,044
<b>Change in Average Sales Price</b>				
Dollars	\$40,196	\$43,392	\$40,448	\$19,877
Percent	15.9%	24.6%	31.7%	14.9%

Source: Multiple Listing Service (MLS), 2008

~~The regional housing price differentials appear to have had a profound affect on commuting patterns. The Comprehensive Economic Development Strategy (CEDS), Regional Data Profile (page 10), shows Jefferson County with the highest level of workers commuting to another county for employment than any other county in the region. The data indicate that 24.4% of the Jefferson County workforce commute to another county for employment, compared to 19.6% in Crook and just 5.8% in Deschutes. In addition, this number has grown by 55% in just 10 years (from 15.7% in 1990). An analysis of the entire CEDS report leads to the conclusion that housing costs have already had a dramatic impact on where people choose to live in Central Oregon.~~

~~The housing data show the following trends:~~

- ~~• With respect to housing, Madras is the least expensive community in Central Oregon~~
- ~~• Lot prices are significantly lower in Madras; land is a significant contributor to overall housing prices;~~
- ~~• Development activity is increasing in Madras. Since 2004, building permits have increased seven fold. Moreover, between 2005 and 2006, the City's population increased by 480 persons—an 8% increase. New population creates demand for housing.~~
- ~~• This housing and land price differential will have a measurable impact on population increases in Madras.~~

~~In summary, rapid employment growth near Madras from the correctional facility, combined with new housing opportunities that have very competitive pricing and options, will have a major impact on the local housing market.~~

### ~~Deer Ridge Correctional Institution~~

~~The Oregon Department of Corrections is in the process of building the Deer Ridge Correctional Institution, a facility that will house 1,884 inmates and provide treatment for an additional 200 inmates, located approximately three miles east of Madras. The facility will consist of a minimum-security prison with about 684 beds, a medium-security prison with about 1,240 beds, and a drug and alcohol treatment program with about 200 beds. Prison construction began in October 2005. The Department of Corrections expects construction on the minimum-security prison to be completed by December 2006, with completion of the medium-security prison in December 2007.~~

~~The Department of Corrections conducted a Community Impact Study (CIS) for the proposed facility. The study, completed by Benkendorf Associates, evaluated the social and economic impacts of the facility. This was done using IMPLAN, an econometric model.~~

~~The prison will affect population growth in Jefferson County and Madras in several ways (all dollar figures are in 1999 dollars).~~

- ~~• The Department of Corrections expects the cost of building the facilities will be \$193 million, which includes construction, studies, design, property and easement purchases, and infrastructure improvements for public services. Construction firms in Jefferson County~~

are likely to have a part in this construction work, increasing demand for construction workers for the duration of the project.

- The prison will house about 1,884 inmates, increasing Jefferson County's population by this number of people. Added to this growth is the expected attraction of people for new job opportunities and families of inmates.
- The Department of Corrections expects the prison will employ an estimated 507 full time employees, with an annual payroll of about \$22.6 million. These jobs will attract new residents to the County, as well as employing existing residents.
- In addition to the direct economic impact of jobs created to staff the prison, indirect and induced economic impacts are expected. The CIS estimates the induced employment impacts that result from operation of the prison to be 1,152 jobs in the 2007-2010 period. The total employment impacts are estimated at 1,666 jobs in the 2007-2010 period. The total compensation is estimated at nearly \$50 million annually. For the ongoing employment of indirect and induced economic growth (i.e., not construction employment), the annual average wage is expected to be \$23,481. In 1999, prior to the prison, the annual average wage in Jefferson County was \$23,465, and \$29,103 in the City of Madras.
- The total direct, indirect, and induced impacts resulting from the operation of the prison at full utilization are expected to create an increase in the employment base of 1,666 jobs, with an average wage of \$29,794 per employee, for a total compensation of \$49.6 million entering the local economy each year. Industry output is anticipated to increase by \$202.3 million per year annually as a result of the operation of the prison.
- The CIS estimates that the prison will have a direct population impact of 2,073 new persons in Jefferson County (not including inmates). These individuals would be on top of any baseline growth projection for the county and Madras.

The direct, indirect and induced jobs pay considerably more than existing jobs in the region (the median household income in Madras in 2000 was a little more than \$30,000).

The CIS also estimates impacts to households, housing and population. It indicates that the prison will result in 829 new households in the County. This equates to demand for 829 new housing units, 557 of which are estimated to be owner units and 272 rental units. The income characteristics of the new households are expected to be more affluent than both the county and city average. Ownership housing demand is expected to be concentrated in the \$80,000 to \$112,000, \$128,000 to \$171,000, and over \$202,000 price ranges (in 1999 dollars). The majority of new rental households will be able to afford units priced under \$875 per month, with the greatest demand for units priced below \$740 per month. Thus, prison employees will create demand for housing units, including units that are in a higher price range than historically has existed in Madras. However, Madras is well poised to capture much of this demand, if an adequate supply of buildable land is provided, because of the city's proximity to the prison and the newly adopted planning tools (the Master Planned Community overlay zone) that encourages the development of the type of housing and amenities that will satisfy the housing need created by the prison.



~~Phase III of the CIS recognizes Madras' opportunity to meet the housing demand associated with the prison. Phase III acknowledges that "the characteristics of projected employment indicate that the household income of new residents associated with the operation of the facility will exceed the current average by a substantial margin." CIS Phase III, 22. The study also notes that the City of Madras will experience a residential land need to accommodate higher-end homes. CIS Phase III, 9. The critical need to provide higher-end housing to accommodate the new residents is summarized by the study:~~

~~"Permanent employment associated with operation of the facility is expected to generate substantial residential demand, much of which is expected to be captured within Jefferson County. As the marginal increase in households is expected to be more affluent than the average in the County, new demand associated with the facility is expected to trigger the construction of housing at a higher price point than the historical norm for Jefferson County. The depth of new demand is likely to trigger the development of new subdivisions and rental apartments in the area oriented towards a more affluent market. These projects may also be attractive to local residents.~~

~~"The degree to which housing demand is captured locally will be a function of several factors. These include relevant school districts, amenities and local development activity. Families with children, which are expected to account for a substantial amount of the new housing demand, will be sensitive to the perceived quality of the local schools. The quality of local housing options relative to alternatives in Deschutes and Crook Counties will also be a factor in Jefferson County's ability to capture growth. The local advantage of proximity to employment will be balanced against the relative quality of housing opportunities and local amenities." CIS Phase III, 22.~~

~~In summary, the Deer Ridge Correctional Institution will impact the population of Jefferson County and Madras significantly. It will add 1,884 people to the County in group quarters. Moreover, it will attract new households that seek housing near the prison, but is superior to the existing housing stock in Madras and the County. In order to capture this housing need, Madras will need to provide higher end housing with amenities that is competitive with alternatives in the region, such as Ironhorse and NorthWest Crossing. If Madras is unable to provide this housing alternative, it is likely that the new households will locate in Deschutes or Crook County, and only travel through Madras to get to work.~~

## ~~**STEP 2. DESCRIBE THE DEMOGRAPHIC CHARACTERISTICS OF THE POPULATION AND, IF POSSIBLE, HOUSING TRENDS THAT RELATE TO DEMAND FOR DIFFERENT TYPES OF HOUSING**~~

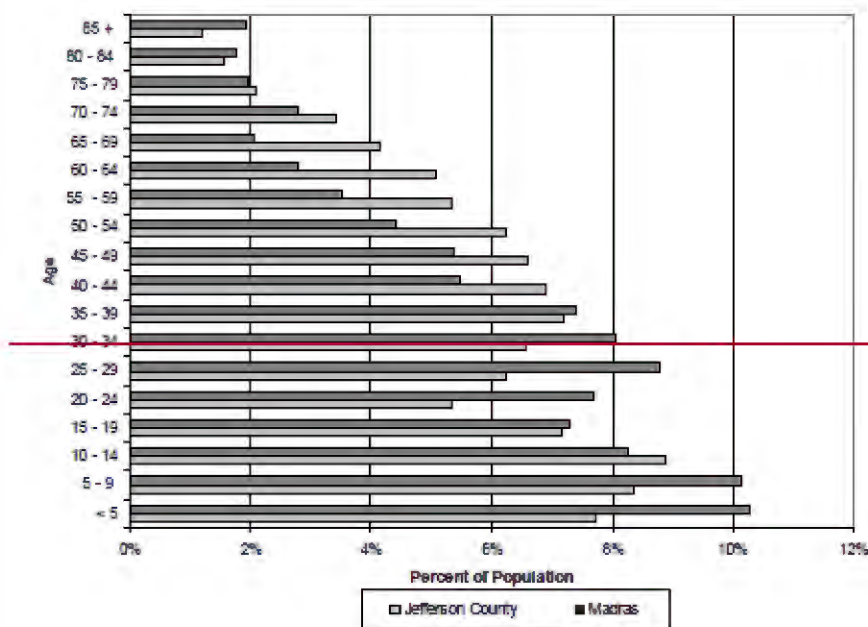
~~Demographic characteristics are highly correlated with housing need. Factors such as age, income, migration and other trends affect both demand and need for housing.~~

~~Figure 4-4 compares age in the City of Madras and Jefferson County for 2000.~~

~~The data show that Madras has more young and old residents than Jefferson County. Madras has a higher percentage of its population in the following age classes: 39 years and younger and 80 years and older. Madras has a lower proportion of its population in the 40 to 79 age ranges. These trends suggest that Madras is attracting younger people, including families with children. The CIS reflects this trend, and notes that families with children are expected to account for a substantial amount of the new housing demand associated with the prison. As these young~~

families mature and upgrade their housing, Madras will have an increased chance of retaining these families if higher end housing is available.

**Figure 4-4. Age distribution, Madras and Jefferson County, 2000**



Source: U.S. Census, Summary File 1

During the 1990's Madras experienced changes in the age structure of its residents. Table 4-7 shows population by age for Madras for 1990 and 2000. The Census data show that Madras grew by 1,635 people between 1990 and 2000, which is a 47% increase. Madras experienced an increase in population for every age group. The fastest growing groups were 5 to 17 years and 45 to 64 years. The slowest growing groups were under 5 years, as well as 65 years and over.

A comparison of population increase by age between Madras and Jefferson County shows that:

- Madras grew faster than Jefferson County. The population of Madras increased by 47% between 1980 and 2000 and Jefferson County experienced a 39% population increase.
- As compared to the County, Madras had a higher percentage increase in all age groups younger than 44 years. Madras had proportionately slower growth in age groups older than 45 years. The proportionally higher growth of the 45-64 age group in Jefferson County demonstrates a missed opportunity for Madras to capture the growth in created by retirees, especially active retirees, who seek communities with recreational and social amenities. These so called "active adult retirement communities," which are not necessarily age restricted, share qualities with destination resorts and master planned communities in the area. Neighborhoods that are desirable to active retirees include a variety of housing types of a relatively high quality, and frequently a golf course is the centerpiece of the neighborhood. If Madras provides housing that included some of these amenities, the City would be attractive to active retirees.

**Table 4-7. Population by Age, City of Madras 1990 and 2000**

Age Group	1990		2000		Change		
	Number	Percent	Number	Percent	Number	Percent	Share
Under 5	395	11%	521	10%	126	32%	-1%
5-17	688	20%	1,158	23%	470	68%	3%
18-24	366	11%	538	11%	172	47%	0%
25-44	1,020	30%	1,509	30%	489	48%	0%
45-64	496	14%	818	16%	322	65%	2%
65 and over	478	14%	534	11%	56	12%	-3%
<b>Total</b>	<b>3,443</b>	<b>100%</b>	<b>5,078</b>	<b>100%</b>	<b>1,635</b>	<b>47%</b>	<b>0%</b>

Source: U.S. Census, 1990 and 2000

The U.S. Census collects information about migration patterns. Specifically, it asks households where their residence was in 1995 (5 years prior to the Census count). Table 4-8 shows place of residence in 1995 for Madras and Jefferson County. The data show that residents of Madras are more mobile than residents of Jefferson County. Thirty-five percent of residents in Madras lived in the same residence in 1995, compared with 45% in Jefferson County. About one-third of residents in Jefferson County and Madras lived in a different county in 1995; about 16% of Madras residents lived in a different state in 1995. These trends indicate that migration is an important factor in Madras' past growth. The jobs created by the prison and households seeking the Central Oregon lifestyle indicate that migration will also be an important factor in Madras' future growth, especially if appropriate housing is provided.

**Table 4-8. Place of residence in 1995, Jefferson County and Madras persons 5 years and over**

Location	Jefferson County		Madras	
	Persons	Percent	Persons	Percent
Population 5 years and older	17,610	100%	4,537	100%
Same house in 1995	8,007	45%	1,589	35%
Different house in 1995	9,603	55%	2,948	65%
Same county	3,976	23%	1,475	33%
Different county	5,450	31%	1,389	31%
Same state	3,520	20%	684	15%
Different state	1,930	11%	705	16%

Source: U.S. Census, SF-3

Table 4-9 shows the number of persons of Hispanic or Latino origin for Madras and Jefferson County for 1990 and 2000. The Census data show that Madras has a larger proportion of Hispanic/Latino population. In 2000, Madras' population was about 36% Hispanic/Latino, significantly higher than 18% in Jefferson County or 4% in Deschutes County. Madras' Hispanic/Latino population grew by 146% between 1990 and 2000. Madras' Hispanic/Latino population is growing faster than the overall population, which conforms to statewide trends. National demographic trends suggest this trend will continue in Madras.

**Table 4-9. Persons of Hispanic or Latino origin, City of Madras and Jefferson County, 1990 and 2000**

	Madras	Jefferson County
<b>1990</b>		
Total Population	3,443	13,676
Hispanic or Latino	739	1,448
Percent Hispanic or Latino	21.5%	10.6%
<b>2000</b>		
Total Population	5,078	19,009
Hispanic or Latino	1,815	3,372
Percent Hispanic or Latino	35.7%	17.7%
<b>Change 1900-2000</b>		
Hispanic or Latino	1,076	1,924
Percent Hispanic or Latino	146%	133%

Source: U.S. Census, SF-1, 1990 and 2000

A clear linkage exists between demographic characteristics and housing choice. This is more typically referred to as the linkage between life-cycle and housing choice and is documented in detail in several publications. ECONorthwest used Public Use Microsample (PUMS) data from the 2000 Census to describe the relationship between selected demographic characteristics and housing choice. This analysis identified several key relationships:

- Homeownership rates increase as income increases;
- Homeownership rates increase as age increases;
- Choice of single-family detached housing types increases as income increases;
- Renters are much more likely to choose multiple family housing types than single-family; and
- Income is a stronger determinate of tenure and housing type choice for all age categories.

It is not a given that historical demographic trends will continue indefinitely. The key variable is in-migration. The following findings from the *Jefferson County Coordinated Population Forecasts*, underscore the role that in-migration is likely to play in Madras:

- Only 45% of the residents of Jefferson County lived in the same house in 2000 as they did in 1995. Thirty-one percent of the County's residents lived in a different county in 1995 and 11% lived in a different state.
- The lower housing costs and proximity to Bend are likely to continue attracting people to Jefferson County. New development and employment, such as the Deer Ridge Correctional Institution (direct, indirect and induced employment), is expected attract new residents to the area. Because of Madras' proximity to the prison, it has the opportunity to capture much of the new growth if appropriate housing is available.



- ~~• While it is difficult to forecast the actual migration rates, it is likely that migration will account for an increasing amount of population growth. According the 2004 PSU population report, about 50% of the population increase in Jefferson County between 2000 and 2004 was due to in migration. Nearly 90% of the population increase in Deschutes during this period was due to in migration. This supports the assumption that in migration will play a greater role in Jefferson County in the future.~~

~~These findings suggest that more than half of new residents in Madras between 2006 and 2026 will be from other places. It is difficult to forecast the characteristics of these residents. This, combined with the regional and local factors that will affect the housing market described in Step 1, will have several direct impacts on housing demand in Madras:~~

- ~~1. Higher wage jobs associated with the prison will create demand for housing beyond the base demand in the region. This demand will be for homes that are valued higher and have more amenities than what Madras has historically seen.~~
- ~~2. The price differential between Madras and other Central Oregon communities is already affecting the local housing market. Building activity is up in Madras, and several major developments are proposed.~~
- ~~3. The combination of the prison, lower cost housing (as compared to Deschutes County) with amenities and local amenities will be attractive to families and active retirees.~~
- ~~4. A master planned community with the right mix of amenities may also attract some second home buyers. Madras is considerably closer to Portland than other Central Oregon communities and has a comparative advantage in that respect.~~

### ~~**STEP 3. DETERMINE THE TYPES OF HOUSING THAT ARE LIKELY TO BE AFFORDABLE TO THE PROJECTED HOUSEHOLDS BASED ON HOUSEHOLD INCOME**~~

~~Step three of the housing needs assessment results in an estimate of need for housing by income and housing type. This requires some estimate of the income distribution of future households in the community. ECO developed these estimates based on estimated household incomes of individuals that work at major employers in Madras, the economic impact of the Deer Ridge Correctional Institution (direct, indirect and induced employment), and evaluation of income trends in Jefferson County.~~

~~A typical standard used to determine housing affordability is that a household should pay no more than 30% of its total monthly household income for housing, including utilities. According to the U.S. Census, 514 households in Madras— about 36%—paid more than 30% of their income for housing in 2000. This figure is slightly higher than the statewide figure of 31%.~~

~~One way of exploring the issue of financial need is to review wage rates and housing affordability. Table 4-10 shows an analysis of affordable housing wage and rent gap for households in Madras at different percentages of median family income (MFI). The data are for a typical family of four. The results indicate that a household must earn about \$10.64 an hour to afford a two-bedroom unit according to HUD's market rate rent estimate. It is worth noting that Jefferson County is among the more affordable locations in the state, and Central Oregon according to this analysis.~~

**Table 4-10. Analysis of affordable housing wage and rent gap by HUD income categories, Jefferson County, 2006**

Value	Minimum Wage	30% MFI	50% MFI	80% MFI	100% MFI	120% MFI
Annual Hours	2086	2086	2086	2086	2086	2086
Derived Hourly Wage	\$7.25	\$6.79	\$11.31	\$18.10	\$22.63	\$27.15
Annual Wage At Minimum Wage	\$11,328	\$14,160	\$23,600	\$37,760	\$47,200	\$56,640
Annual Affordable Rent	\$3,398	\$4,248	\$7,080	\$11,328	\$14,160	\$16,992
Monthly Affordable Rent	\$283	\$354	\$590	\$944	\$1,180	\$1,416
HUD Fair Market Rent(2 Bedroom)	\$555	\$555	\$555	\$555	\$555	\$555
Is HUD Fair Market Rent Higher Than The Monthly Affordable	Yes	Yes	No	No	No	No
Rent Paid Monthly OVER 30% of Income	\$272	\$201	na	na	na	na
Rent Paid Annually OVER 30% of Income	\$3,262	\$2,412	na	na	na	na
Percentage of Income Paid OVER 30% of Income for Rent	29%	17%	na	na	na	na
Total Spent on Housing	59%	47%	28%	18%	14%	12%
For this area what would the "Affordable Housing Wage" be?	\$10.64	\$10.64	\$10.64	\$10.64	\$10.64	\$10.64
The Affordable Housing Wage Gap IS:	\$3.39	\$3.85	na	na	na	na

Source: HUD, Oregon office; analysis by ECONorthwest  
MFI: Median family income

The total amount a household spends on housing is referred to as cost burden. Total housing expenses are generally defined to include payments and interest or rent, utilities, and insurance. HUD guidelines indicate that households paying more than 30% of their income on housing experience "cost burden" and households paying more than 50% of their income on housing experience "severe cost burden." Using cost burden as an indicator is consistent with the Goal 10 requirement of providing housing that is affordable to all households in a community.

Table 4-11 shows housing costs as a percent of income by tenure for Madras households in 2000. The data show that about 36% of Madras households experienced cost burden in 2000. The rate was about the same for renters (37%) than for homeowners (35%). This is unusual among Oregon cities—a more typical trend is for a much higher percentage of renters to experience cost burden than homeowners.

Based upon the HUD income categories, the annual average wage from direct employment from the prison (almost \$44,000) is between the 80% and 100% MFI, and the annual average wage from all employment (direct, indirect and induced) from the prison (\$23,481) is just less than 50% MFI. It is expected that the lower paid prison-related new households will rent homes. The majority of new rental households will be able to afford units priced under \$875 per month, with the greatest demand for units priced below \$740 per month—both price points are affordable to households between 50% and 80% MFI. Therefore, even the lower paid new households are not expected to experience cost burden.

**Table 4-11. Housing cost as a percentage of household income, Madras 2000**

Percent of Income	Renters		Owners		Total	
	Number	Percent	Number	Percent	Number	Percent
Less than 20%	268	33.8%	253	39.8%	521	36.4%
20% - 30%	236	29.7%	159	25.0%	395	27.6%
30% - 40%	89	11.2%	145	22.8%	234	16.4%
40% - 50%	100	12.6%	24	3.8%	124	8.7%
50% or more	101	12.7%	55	8.6%	156	10.9%
Total	794	100.0%	636	100.0%	1,430	100.0%
Cost Burden	290	36.5%	224	35.2%	514	35.9%

Source: 2000 Census

Table 4-12 shows a rough estimate of affordable housing cost and units by income levels for Madras in 2000. Several points should be kept in mind when interpreting this data:

- Because all of the affordability guidelines are based on median family income, they provide a rough estimate of financial need and may mask other barriers to affordable housing such as move-in costs, competition for housing from higher income households, and availability of suitable units. They also ignore other important factors such as accumulated assets, purchasing housing as an investment, and the effect of down payments and interest rates on housing affordability.
- Households compete for housing in the marketplace. In other words, affordable housing units are not necessarily available to low income households. For example, if Madras has a total of 50 dwelling units that are affordable to households earning 30% of median family income, 50% of those units may already be occupied by households that earn more than 30% of median family income.

The data in Table 4-12 indicate that in 2000:

- Nearly 20% of Madras households could not afford a studio apartment according to HUD's estimate of \$315 as fair market rent in 2000.
- Around 27% of Madras households cannot afford a two-bedroom apartment at HUD's fair market rent level of \$484 in 2000.
- There is a surplus of 462 units of housing that is affordable for households that earn less than the median family income.
- There is a deficit of 288 units of housing that is affordable to higher income households (i.e., above the MFI). The deficit of housing in this category in 2000 is expected to become significantly more severe once the prison is operational and there is demand for higher end housing (as detailed above).
- A household earning a median family income (\$35,900) could afford a home valued up to about \$89,750 in 2000.

**Table 4-12. Rough estimate of housing affordability, Madras, 2000**

Income Level	Number of HH	Percent	Affordable Monthly Housing Cost	Crude Estimate of Affordable Purchase Owner-Occupied Unit	Est. Number of Owner Units	Est. Number of Renter Units	Surplus (Deficit)	Notes
Less than \$10,000	234	14.8%	\$0 to \$250	\$0 to \$25,000	0	122	-112	
\$10,000 to \$14,999	183	11.6%	\$250 to \$375	\$25,000 to \$37,000	0	121	-62	HUD FMR Studio: \$315; 1 bdrm \$373
\$15,000 to \$24,999	112	7.1%	\$375 to \$625	\$37,500 to \$62,500	88	474	450	HUD FMR 2 bdrm: \$484 HUD FMR 3 bdrm: \$667; 4 bdrm: \$742
\$25,000 to \$34,999	329	20.8%	\$625 to \$875	\$62,500 to \$87,500	210	129	10	
\$35,000 to \$49,999	342	21.6%	\$875 to \$1,250	\$87,500 to \$125,000	311	33	-2	HUD FMR 4 bdrm: \$945
Jefferson County median (2000):			\$35,900	\$896				
\$50,000 to \$74,999	284	17.9%	\$1,250 to \$1,875	\$125,000 to \$187,500	82	0	-202	
\$75,000 to \$99,999	60	3.8%	\$1,875 to \$2,450	\$187,500 to \$245,000	4	0	-56	
\$100,000 to \$149,999	30	1.9%	\$2,450 to \$3,750	\$245,000 to \$375,000	0	0	-30	
\$150,000 or more	9	0.6%	More than \$3,750	More than \$375,000	9	0	0	
Total	1,583	100.0%			704	679	0	

Sources: 2000 Census, and Oregon Housing & Community Services. Housing Strategies Workbook: Your Guide to Local Affordable Housing Initiatives, 1993.

Notes: FMR-Fair market rent



As a final step in the housing affordability analysis, ECO performed a rough correlation of income with needed housing types as defined by ORS 195.303. This analysis is also consistent with guidance provided in the Workbook. Table 4-13 shows ECO's evaluation for market segments, incomes, and financially attainable housing products. We use the HUD income guidelines as the market segments and Census data for the income distribution. The table provides an estimate of financially attainable housing types by income and tenure. Households in the upper-middle and high-income segments will be able to afford new housing.

The conclusion based on the 2000 Census data is that Madras had a deficit of 174 dwellings for households that earn less than \$15,000 annually (about \$7.50 per hour). The results suggest that the City has a need for as many as 160 government-assisted housing units.

Table 4-13 indicates Madras has housing needs at all income levels. In 2000, about 20% of the housing need could be considered above moderate income based on the City's income distribution. This could include some dual income household with workers at the correctional facility. Twenty-two percent of the need is for the above moderate income segment. This income range includes many of the workers at the correctional facility.

The average wage of the direct employment for the prison will be slightly less than \$44,000, and the projected housing need for the approximately 557 owner-occupied units will be in the price ranges of \$80,000—\$112,000, \$128,000—\$171,000 and \$202,000 and above (in 1999 dollars).

For the low end of this housing need spectrum, in 2000 there was a surplus of only 12 units. For the remainder of this housing spectrum, there is an existing deficit. This need correlates to the Upper Middle and High-income household segments in Table 4-13.

**Table 4-13. Financially attainable housing type by income range, Madras, 2000**

Market Segment by Income	Income range	Number of Households	Percent of Households	Financially Attainable Products		
				Owner-occupied	Renter-occupied	
High (120% or more of MFI)	\$56,640 or more	359	20%	All housing types; higher prices	All housing types; higher prices	↑ Primarily New Housing
Upper Middle (80%-120% of MFI)	\$37,760 to \$56,640	397	22%	All housing types; lower values	All housing types; lower values	
Lower Middle (50%-80% of MFI)	\$23,800 to \$37,760	484	27%	Manufactured on lots; single-family attached; duplexes	Single-family attached; detached; manufactured on lots; apartments	↑ Primarily Used Housing
Low (30%-50% or less of MFI)	\$14,160 to - \$23,800	145	8%	Manufactured in parks	Apartments; manufactured in parks; duplexes	↓
Very Low (Less than 30% of MFI)	Less than \$14,160	438	24%	None	Apartments; new and used government assisted housing	

Source: Estimates by ECONorthwest

**~~STEP 4: ESTIMATE THE NUMBER OF ADDITIONAL NEEDED UNITS BY STRUCTURE TYPE—HCS HOUSING MODEL FORECAST BY DENSITY AND TYPE MIX~~**

~~ECONorthwest used the HCS Housing Needs Model to identify current affordability gaps and address the Goal 10 requirements. The model considers the current and projected demographics, existing housing inventory, and regional tenure choices, to arrive at the number of needed housing units by tenure, price point, and housing type. Following is a summary of the output from the HCS Housing Needs Model.~~

~~Table 4-14 shows current unmet housing needs (2006) as indicated by the HCS small city model. The results indicate a deficit of more than 91 rental units in the under \$235 price level. The model output also indicates a deficit of rental units for prices above \$785. Interestingly, the model indicates a total surplus of 244 rental units.~~

~~The model also indicates a deficit of ownership units at prices less than \$100,000 and at prices more than \$167,000. The model, however, indicates a total surplus of 111 ownership units based on a conclusion that the market has overproduced units in the \$100,000 - \$167,000 range. This result is consistent with the analysis of 2000 Census data presented in Table 4-13.~~

**~~Table 4-14. Current unmet housing needs, 2006, HCS Model Output (Small City Version)~~**

Rental				Ownership			
Rent	Current Unmet Need / (Surplus)	% of Need Met	Cumulative Units Needed	Price	Current Unmet Need / (Surplus)	% of Need Met	Cumulative Units Needed
0 - 235	91	51.5%	91	<66.9k	38	75.6%	38
236 - 509	(199)	211.3%	(108)	66.9k < 100.3k	126	58.2%	164
510 - 784	(231)	215.6%	(339)	100.3k < 133.7k	(88)	133.0%	76
785 - 1074	29	79.0%	(310)	133.7k < 167.2k	(31)	115.5%	44
1075 - 1359	39	58.3%	(271)	167.2k < 250.8k	35	86.8%	80
1359 +	27	29.3%	(244)	250.8k+	69	46.0%	149

~~Source: Oregon Housing and Community Services Housing Needs Model; output for the City of Madras  
Notes: Values in 2006 dollars; 2006 dollars based on the inflation calculator available at <http://www.bls.gov/cpi/> (the website for the Bureau of Labor Statistics, of the US Dept. of Labor)~~

~~The HCS Housing Needs Model also outputs estimates of future housing needs. Those needs are based on the following general assumptions which ECO used as input to the HCS model:~~

- ~~• Household incomes will rise significantly during the planning period due to the prison and other economic development activities.~~
- ~~• This increase in income will affect housing choice. Madras will see a greater percentage of single-family stick built units and fewer manufactured units and apartments over the planning period.~~
- ~~• The increase in income will create greater demand for higher priced units and for units within neighborhoods that include amenities.~~

~~Table 4-15 shows that Madras will need 2,948 new dwelling units between 2006 and 2026. The model output shows the following needed housing characteristics:~~

- ~~65% of new housing units (1,914 dwellings) should be ownership units. This figure is considerably higher than the 47% observed by the 2000 Census. This shift is reflective of higher incomes and more job opportunities that are expected to occur in Madras over the planning period. The implications of this output are that the model predicts many more households in Madras will choose to own in the 20-year planning period.~~
- ~~72% of needed units (2,113 dwellings) should be single-family types (this figure includes single-family attached housing—condominiums and townhomes).~~
- ~~Madras needs about 250 dwelling units that rent for less than \$509 (in 2006 dollars).~~
- ~~Madras needs about 700 new ownership units that are priced less than \$100,000 (in 2006 dollars).~~
- ~~Madras will need more higher end rental units—the model predicts a need for 392 rental units that rent for more than \$1,075 (in 2006 dollars).~~
- ~~Madras will need more higher end ownership units. The model predicts a need for 341 dwellings priced at more than \$250,000 and 552 dwellings that priced between \$167,000 and \$250,000 (in 1999 dollars). To be competitive with surrounding communities, the higher end ownership need should have a master planned community as an available housing choice. This housing type requires a minimum of 200 acres. The model does not account for households purchasing second homes or active pre-retirees buying in advance of retirement. Both housing segments are typically affluent, and expect high quality housing that has recreational and social amenities.~~

**Table 4-15. Future dwelling units needed by type and price, 2006-2026, greater Madras, HCS Model Output**

Rent	Needed Units	Single Family Units	Manufactd Dwelling Park Units	Duplex Units	Tri-Quadplex Units	5+ Multi-Family Units	Total Units
<b>New Rental Units Needed</b>							
0 - 235	244	24	32	19	14	154	244
236 - 509	10	(18)	(28)	1	1	50	10
510 - 784	108	18	(32)	11	11	103	108
785 - 1074	279	162	9	12	18	79	279
1075 - 1359	263	193	16	0	0	55	263
1359 +	129	110	5	0	0	14	129
<b>Totals</b>	<b>1,034</b>	<b>489</b>	<b>5</b>	<b>44</b>	<b>42</b>	<b>454</b>	<b>1,034</b>
<b>Percentage</b>		<b>47.3%</b>	<b>0.5%</b>	<b>4.2%</b>	<b>4.1%</b>	<b>43.9%</b>	<b>100.0%</b>
<b>New Ownership Units Needed</b>							
<66.9k	386	281	100	25	0	0	386
66.9k < 100.3k	313	205	61	47	0	0	313
100.3k < 133.7k	87	72	(4)	22	(3)	0	87
133.7k < 167.2k	234	213	28	0	0	(7)	234
167.2k < 250.8k	552	533	24	0	0	(5)	552
250.8k+	341	341	0	0	0	0	341
<b>Totals</b>	<b>1,914</b>	<b>1,824</b>	<b>210</b>	<b>95</b>	<b>(3)</b>	<b>(12)</b>	<b>1,914</b>
<b>Percentage</b>		<b>84.9%</b>	<b>11.0%</b>	<b>4.9%</b>	<b>-0.2%</b>	<b>-0.6%</b>	<b>100.0%</b>
<b>Total New Rental and Ownership Units</b>							
<b>Totals</b>	<b>2,948</b>	<b>2,113</b>	<b>215</b>	<b>138</b>	<b>39</b>	<b>442</b>	<b>2,948</b>
<b>% of Total Units</b>		<b>71.7%</b>	<b>7.3%</b>	<b>4.7%</b>	<b>1.3%</b>	<b>15.0%</b>	<b>100.0%</b>

Source: Oregon Housing and Community Services Housing Needs Model; output for the City of Madras  
 Note: Values in 1999 dollars



The HCS Housing Needs Model is one method of estimating housing needs by housing type and price. The model has many limitations, however. One is that it is virtually impossible to forecast income distributions 20 years out. There is ample evidence that household incomes will increase in Madras over the planning period. ECO used model inputs that reflect the impact of the new Deer Ridge Correctional facility on household incomes.

Moreover, our understanding is that the model uses regional data to forecast future need by tenure. In the instance of the model run just presented, the model forecasts a significant tenure shift. This is consistent with what one would expect for Madras: that as incomes rise, more households will choose ownership products.

Another limitation of the model is that it does not allow for allocation to single-family attached housing products (ownership units that achieve multifamily densities). ECO estimates that as much as 5% of housing need could be single-family attached housing types either as townhouse style, row-house style or multi-story products. The Ironhorse and Northwest Crossing master planned communities each included about 8% of total housing as townhomes. We include these in housing types in our acreage estimates shown in the following section.

Finally, the model identifies housing need in the lowest price ranges. We agree that these needs exist and will probably exist during the 2007-2027 planning period, but it seems unlikely that the market will produce these units without significant financial incentives or subsidies. Based on existing program support, however, it appears the amount of funds available for government-assisted housing subsidies will be sufficient to build only a small fraction of these dwellings. In other words, it is our opinion that unless government allocation of funds to housing significantly increases, these low rent/price units will not be available. Moreover, land use policy is relatively limited in its ability to dictate what the market builds. The primary intent of land use planning and conducting a housing needs assessment is to ensure that local governments designate enough land for different housing types. For example, based upon a historic deficit of high end housing, the City adopted comprehensive plan policies and a new overlay zone (the Master Planned Community overlay zone) that encourages the development of housing that is suitable for higher income households.

### Siting Requirements

Two segments of the needed housing types have specific site requirements. The remainder do not have specific site requirements because a variety of housing types would suit their needs. For example, owners who fall in the lower-middle income market segment can afford homes that range from approximately \$56,000 to \$85,000. Within this range the generally financially attainable housing products are single-family attached homes, manufactured homes on separate lots and duplexes. These housing types can be found in any single-family residential zone, parcel size or location in the City. The two market segments that are not as adaptable and that need parcels with specific attributes include:

1. Very Low Income (MFI) Renters: New product (priced less than \$200 a month) targeted to this group will be government assisted housing built with low income housing tax credits. The added legal and accounting costs associated with this funding mechanism can only be offset by development with at least 40 units. At approximately 12 units per acre, this requires a parcel of at least 3.3 net acres.

~~2. Upper Middle and High Income (MFI) Owners: To be successful when compared to other housing choices in the region, a high-end development in Madras needs to have the same kinds of amenities as the master planned communities in Bend and Prineville. The recently adopted Master Planned Community overlay zone provides the planning tool to develop comparable housing. The Master Planned Community overlay zone requires that the site be at least 200 acres.~~

### ~~50-Year Forecast for Housing Needs~~

~~The final step in the analysis is to allocate needed housing by type and density and covert it to land needs. The HCS model output suggested that the needed tenure split for Madras is 65% single-family and 35% multiple family. Table 4-16 shows tenure by housing type in 2000. The data show that the overall tenure split in 2000 had a much higher percentage of renters than the HCS model suggests the community needs. Thus, the City will need to plan for more ownership housing.~~

~~The results also show that single-family and manufactured housing types have a much higher ownership rate than other housing types. In fact, 24% of the city's 1,273 single-family and manufactured homes were rented in 2000. Moreover, single-family and manufactured housing accounted for one-third of all the rental housing in the community.~~

~~Interestingly, 84% of the city's condos/townhomes (single-family attached) units were rented in 2000. This is counter to conventional wisdom that single-family attached types are primarily an ownership product. Conversely, the data suggest that single-family and manufactured dwellings will continue to meet some of the city's rental needs.~~

**Table 4-16. Tenure by housing type, Madras, 2000**

Units in Structure	Owner Occupied		Renter Occupied		Total	
	Number	Percent	Number	Percent	Number	Percent
Single-family	667	80%	167	20%	834	100%
Manufactured	225	66%	114	34%	339	100%
Condos/Townhomes	8	16%	42	84%	50	100%
Apartments	7	1%	516	99%	523	100%
Total	907	52%	839	48%	1,746	100%

Source: US Census, SF-3, 2000

~~The Madras Urbanization Study takes a long-term view of growth in the community. ECO only used the HCS model to analyze housing needs during the 2006-2026 period. The City, however, is interested in establishing Urban Reserve Areas (URAs) based on a 50-year forecast. Table 4-17 shows the alternative forecast of needed housing units in Madras for the period 2007-2027 and 2007-2057. The assumed residential mix is consistent with the HCS model output: 61% single-family, 7% manufactured (mobile home), and 25% multiple family. We assume that 7% of new single-family housing types will be attached. This mix assumes that about 10% of the city's rental housing needs will be met through single-family and manufactured housing types. This is significantly lower than the 33% observed in 2000~~



**Table 4-17. Forecast of needed housing units by type, Madras, 2007-2027 and 2007-2057  
Needed Dwelling Units**

Housing Type	Housing	Needed Dwelling Units	
		2007-2027	2007-2057
<b>Single-family</b>			
Single-family detached	61%	1,791	5,516
Manufactured	7%	206	633
Condo/Townhomes	7%	206	633
Subtotal	75%	1,996	6,781
<b>Multi-family</b>			
Multifamily	25%	734	2,260
Subtotal	25%	2,936	2,260
<b>Total</b>	<b>100%</b>	<b>2,936</b>	<b>9,042</b>

Source: ECONorthwest

**STEP 5: DETERMINE THE NEEDED DENSITY RANGES FOR EACH PLAN DESIGNATION AND THE AVERAGE NEEDED NET DENSITY FOR ALL STRUCTURE TYPES**

Table 4-18 shows the forecast of needed housing units in Madras for the period 2007-2027 and 2007-2057. Madras makes the following findings in support of the density assumptions used in Table 4-18:

- Madras has an average single-family residential density of 3.0 dwelling units per net acre or about 14,520 square feet (Table 4-3). Average single-family densities differ by zone, with the R-1 zone having the lowest average density (2.3 dwelling units per net residential acre, or about 18,900 square foot lots). The R-2 zone averaged 4.8 single-family dwellings per net acre (about 9,075 square foot lots), and the R-3 zone averaged 6.4 dwelling units per net residential acre (about 6,800 square foot lots).
- National homeownership trends increased over the past five years to nearly 70%. The homeownership rate in Madras in 2000 was considerably lower at 52%. It is the policy of the City to provide homeownership opportunities.
- National trends are towards larger units on smaller lots.
- Madras was the most affordable community in Central Oregon in 2005. The average sales price of single-family units in Madras was about \$163,000 compared to nearly \$300,000 in Bend.
- Construction and operation of the Deer Ridge Correctional Facility will create jobs that pay considerably higher than the prevailing average in Madras.
- Nearly 1/3 of dwelling units in Madras in 2000 were multifamily types.

- ~~The minimum lot size for single-family dwellings in the R-1 and R-2 zones is 7,500 square feet; the minimum lots size in the R-3 zone is 6,000 square feet. Lots created before the enactment of Ordinance No. 252 are limited to one single-family dwelling per lot.~~
- ~~The average assumed net density for single-family dwellings in the housing needs analysis is 4.8. This equates to a lot size of about 8,800 square feet, or about 17% larger than the minimum lot size in the R-1 and R-2 zones, but significantly lower than the current average single-family lot size of 14,520 square feet.~~
- ~~Topography, lot configurations, and other factors typically reduce land use efficiency. The assumed average single-family density provides for land use inefficiencies.~~
- ~~The HCS *Housing Needs Model* predicts a needed tenure of 65% owner-occupied types. It also predicts 72% of needed housing should be single-family types. The City applies the HCS housing mix in its acreage estimates.~~
- ~~The City assumes an average multifamily density of 12.9 dwellings per net acre or a land area of about 3,375 square feet per dwelling unit. While empirical data are not available for historical multifamily densities, these assumptions are consistent with densities observed in other communities for similar housing types.~~

~~In summary, the City assumes that densities will increase significantly over historical densities over the planning period, that ownership rates will increase, and that more households will choose single-family housing types. These assumptions are consistent with the housing needs analysis presented in this chapter and with the output from the HCS housing needs model. These findings support the City's overall density assumption of 5.9 dwelling unit per net acre.~~

~~The forecast indicates that Madras will need about 463 net residential acres, or about 636 gross residential acres to accommodate new housing between 2007 and 2027. About 1,496 net residential acres and 1,938 gross residential acres would be required to accommodate new housing between 2007 and 2057. The alternative forecast results in an average residential density of 6.3 dwelling units per net residential acre and of 4.7 dwelling units per gross residential acre~~

**Table 4-18. Forecast of needed housing units and residential land, Madras, 2007-2027 and 2007-2057**

Housing Type	New DU	Percent	Density (DU/net res ac)	Net Res. Acres	Net to Gross Factor	Gross Res. Acres	Density (DU/gross res ac)
<b>Needed Units, 2007-2027</b>							
<b>Single-family types</b>							
Single-family detached	1,791	61%	4.8	373.1	25%	497.5	3.6
Manufactured	206	7%	5.5	37.4	25%	49.8	4.1
Condo/Townhomes	206	7%	9.0	22.8	15%	26.9	7.7
Subtotal	2,202	75%	5.4	410.5		574.2	3.8
<b>Multi-family</b>							
Multifamily	734	25%	14.0	52.4	15%	61.7	11.9
Subtotal	734	25%	14.0	52.4		61.7	11.9
<b>Total</b>	<b>2,936</b>	<b>100%</b>	<b>6.3</b>	<b>462.9</b>		<b>635.8</b>	<b>4.6</b>
<b>Needed Units, 2007-2057</b>							
<b>Single-family types</b>							
Single-family detached	5,516	61%	4.8	1,149.1	25%	1,532.1	3.6
Manufactured	633	7%	5.5	115.1	20%	143.8	4.4
Condo/Townhomes	633	7%	9.0	70.3	15%	82.7	7.7
Subtotal	6,781	75%	5.4	1,334.5		1,758.7	3.9
<b>Multi-family</b>							
Multifamily	2,260	25%	14.0	161.5	10%	179.4	12.6
Subtotal	2,260	25%	14.0	161.5		179.4	12.6
<b>Total</b>	<b>9,042</b>	<b>100%</b>	<b>6.3</b>	<b>1,495.9</b>		<b>1,938.1</b>	<b>4.7</b>

Source: ECONorthwest

Note: Gross acres calculated by dividing net acres by (1-net to gross factor). For example, for single-family detached,  $477.1/(1-.75) = 636.1$ . Conversely,  $636.1 \times .75 = 477.1$ .

## SUMMARY

The housing needs analysis for Madras suggests the city will need to plan for a variety of housing types. Specific housing needs for the 2007-2027 and 2007-2057 period include:

- ~~Need for all housing types: single-family attached and detached, manufactured homes, apartments, and government assisted housing (which can be any housing type).~~
- ~~Need for very low income housing. The HCS Housing Needs Model identified a need for 244 rental units priced at less than \$235 per month and 700 owner-occupied units that sell for less than \$100,000 (in 1999 dollars). The private sector probably cannot produce units at these price points, so the majority of this need will have to be met through government subsidies. Based upon the need for subsidies, providing these units involves particular siting requirements – the very low income housing needs to be developed in clusters of at least 40 units, which requires a parcel of at least 3.3 net acres.~~
- ~~Need for higher value housing. The HCS Housing Needs Model identified a need for 129 rental units in the \$1,150 monthly range, and 263 rental units in the \$1,075 to \$1,359 price range. It also identified a need for 341 owner-occupied units in the \$250,000 and up price range and 552 owner-occupied units in the \$167,000 to \$250,000 price range. A portion of this need should be satisfied by a master planned community with neighborhood amenities, in order to be competitive with surrounding communities. This upper middle and high~~

~~income (MFI) housing need therefore has the special siting requirement of needing at least 200 acres, in accordance with the Master Planned Community overlay zone.~~

- ~~• Demand for second homes and active pre-retirement-oriented housing. The HCS Housing Needs Model does not address vacation/second homes or active pre-retirement-oriented housing. ECO's market analysis suggests that master planned communities in the Madras area will be attractive to some second home buyers or pre-retirement home buyers because of the city's location and the affordable prices (especially in relation to neighboring communities. ECO did not evaluate the depth of the second home or pre-retirement housing market.~~

~~The housing needs analysis identifies the following land needs for the 2007-2027 period:~~

- ~~• 574 gross residential acres for lower density single-family housing types, including single-family detached, attached, and manufactured dwellings.~~
- ~~• 62 gross residential acres for high density housing types including apartments.~~

~~The housing needs analysis identifies the following land needs for the 2007-2057 period:~~

- ~~• 1,759 gross residential acres for lower density single-family housing types, including single-family detached, single-family attached, and manufactured dwellings.~~
- ~~• 179 gross residential acres for high density housing types including apartments.~~

~~[As mentioned at the beginning of this Section, pertaining to Housing / Population, added by Ordinance No. 797 - passed by City Council on December 11, 2007]~~

## **PUBLIC FACILITIES:**

The City of Madras has prepared a Public Facilities Plan (PFP) pursuant to Oregon Administrative Rule 660-011. This Public Facilities Plan is incorporated into the City's Comprehensive Plan by this reference. [A summary of the PFP is included here for reference.](#)

[\[The above paragraph revised by Ordinance No. 918, Passed by Council on July 24, 2018.\]](#)

The City of Madras provides public services to its residents. The following [City](#) departments [play a direct role in the delivery of public facility services](#): Administration, Utility Billing, Community Development ([zoning and subdivision control](#)), Police ([public safety](#)), and Public Works ([transportation, wastewater conveyance and treatment facilities, stormwater conveyance and treatment, water service, and parks and recreation](#)). The City [secures fire protection through the Jefferson County Fire District](#). [Domestic water is purchased from the Deschutes Valley Water District \(DVWD\)](#). The City [distributes domestic water to roughly half of the service connections](#). The DVWD [delivers water directly to the remaining service connections](#).



[The above paragraph revised by Ordinance No. 918, Passed by Council on July 24, 2018.]

## **Deschutes Valley Water District**

Deschutes Valley Water District was formed in 1919 from a private water system, Jefferson Water Company. This private company could not achieve a profitable return, so they chartered the District we have today under Oregon Revised Statutes, Chapter 264. The signatures on the original charter are a “who’s who” of the pioneers of the Culver and Metolius area.

The original service area included the City of Culver, the City of Metolius, and the surrounding agricultural areas from south of Juniper Butte to the north end of Metolius.

The distribution of water throughout the rural area was not feasible in the 1920's because of the sparse population. Instead, the District installed a wooden mainline to a standpipe in the City of Culver. There, residents from outlying areas could fill tanks to transport home. A single 3" pipeline also served the City of Metolius and its outlying areas.

With the formation and completion of the North Unit Irrigation project the Culver/Metolius and Madras areas were broken into 80 to 160 acre parcels and a massive influx of farmers began in the mid 1940's. This sudden population growth required the District to install many new mainlines to distribute domestic water to many of the newly formed farms. During this same period, the area north of Madras, called The Plains, formed a water district to accomplish the same tasks in the area.

In 1948, the Plains Water District and Deschutes Valley Water District merged to form the approximate district boundaries that are in existence today. The conveyance of water over such a great distance (23.6 miles), presented many problems which required long District Board meetings to solve. The District has been fortunate to have faithful and responsible Board members over the years. For many years, the District strived and strained within its budget at times, to deliver water to each service with undersized and leaky mainlines.

The most important milestone in the District’s history was the purchase of Opal Springs in 1958. In 1985, the District’s hydro-electric plant was completed near Opal “Springs. Since then, revenues from that plant have paid annual principal and interest on two water bonds for a savings of over \$4 million in property taxes. Hydro-electric revenues also financed approximately \$6 million of new construction. The District levies no taxes and has no plans to levy taxes in the future, thanks to the hydro-electric revenue.

The District has not had to issue new bonds, water rates have been raised in nine years, and new service hook-up fees have remained at \$600 since 1985, this is largely due to the hydro-electric revenue. Studies are being conducted to determine how much water rates and hook-up fees should be raised. This should be accomplished before the large infusion of new customers in the next couple of years. The new pump house and transmission mainline are expensive projects that would not be necessary if the population did not increase; new customers should bear a reasonable portion of the new development costs.

Deschutes Valley Water District revised its "Master Plan" in December, 2000, in an effort to plan for the future growth of the water district for the next 20 years. The District's first "Master Plan" was completed in May of 1991 and has served as a planning tool.

A major change to the District's source of supply is the addition of three (3) new wells in the vicinity of Opal Springs. The wells range in depth from 513 feet to 750 feet deep. The artesian free flow from the wells is 3750 gpm (gallons per minute), 5360 gpm, and 4000 gpm.

Those improvements and extensions as outlined in earlier Master Plans have been developed over the years. New construction is generally done by the water district's employees.

In 2000, a 201,000 gallon reservoir was built near Jaricho Lane. This reservoir doubled the previous storage while replacing an aged and leaking concrete reservoir. The foundation and piping was constructed by district personnel.

Deschutes Valley Water District has in its Master Plan a policy, which addresses "cross connection". The purpose of this policy is to protect the water supply of Deschutes Valley Water District from contamination or pollution due to any existing or potential cross connection. For more information see Page 11 of the District's revised "Master Plan" year 2000. There is map information within the Master Plan, starting with page 10.

## **SOURCE OF SUPPLY**

The Opal Springs aquifer is the sole source of supply of domestic water for Deschutes Valley Water District (approximately 3600 services). The District also supplies water to the City of Madras water system, which has about 850 services. The artesian spring and three artesian wells are located 5 miles southwest of Culver at the bottom of the 850 foot deep Crooked River canyon, less than 150 feet from the river.

Opal Springs flows approximately 108,000 gallons per minute at 53.8 degrees Fahrenheit with no seasonal variation. There has been no detectable change in flow, temperature, or pH since the spring was first tested in 1925.

Beginning in 1997, the District drilled three production wells all within 750 feet of Opal Springs. These wells were the result of an investigation into how to increase flow capture from Opal Springs. Even though there are massive amounts of water erupting from the Opal Springs vicinity, the sheet wall containment system capturing water from the pumphouse was proving marginal at peak pumping demand. Numerous alternatives were investigated by Dave Newton & Associates and weighed by the District Board. An initial 12" test well was drilled at 500 feet, which produced static pressure of 48 psi and a free flow of over 4000 gpm. Since then, two more 16" wells were drilled with comparable artesian pressures and free flows of 5360 gpm and 4000 gpm.

The three recently drilled artesian wells have proven to be a highly advantageous venture for the District. The existing pumps have an expanded capacity due to the inlet pressure going from 3 psi to about 43 psi (depending on how many pumps are running). Pumping costs out of the canyon are also reduced by about 10%. Another benefit is the more controlled capture of the water without risk from external contamination. The Oregon Water Resources Department has determined that the well water and Opal Springs water come from the same aquifer. This has been determined geologically, from water quality testing comparisons and flow test results.

The quality of Opal Springs water is outstanding. This is especially evident when the Crooked River is flowing at spring run-off. Opal Springs flows into the muddy river as a clear bluish streak. The contrast makes a strong visual impact.

No volatile organic or synthetic compounds (herbicides or pesticides) have been detected by water testing. Various healthful inorganic compounds or minerals are found in the water. Excessive amounts of these minerals could be harmful, but they are far below the maximum allowable concentrations.

Groundwater Study, the USGS had some water age analysis done. According to "USGS Report 97-197", the water could be as old as 1000 to 4000 years old. However old the Opal Springs aquifer is, it is not a typical aquifer. An analysis for waterborne particulates shows conclusively that Opal Springs is a groundwater source, not influenced by surface water.

Currently, there is no infiltration or treatment of Opal Springs of any kind, nor is any needed. The only chlorination being done is on a very limited basis to the District's reservoirs. The District's distribution system North of the Metolius Reservoirs has a very low chlorine residual ranging from 0.01 ppm to 0.03 ppm. This is a preventative amount of chlorine that is designed to keep coliforms from building up in the system.

There are three bottling plants in Culver bottling Opal Springs water. The taste, clarity, and purity of Opal Springs water makes it a popular bottled product.

The initial water-rights to the Opal Springs area were for 3.0 cubic feet per second (cfs) or 1346 gallons per minute (gpm). The initial priority date is September 5, 1918. The current water-rights are not to exceed 25.71 cfs. If all the pumps in the pumphouse and turbine house were activated, 17.269 cfs (7750 gpm) would be withdrawn from the Opal Springs aquifer. This is only 7.2% of the total spring flow. Currently, the District is working on expanding the water-rights by 20 cfs for the next 20 years.

The following table (Future Projects and Timing) lists the future projects and the timing of their construction, which have been determined by Deschutes Valley Water District to be needed for the next 20 years. Immediately following this table, is a narrative for each future project, and its general location.

## FUTURE PROJECTS AND TIMING

TIMING	PROJECT
0-5 years	24" Transmission main, and preparation
	3,000,000 gallon Reservoir at Round Butte, along with site preparation, and foundation
	2,000,000 gallon Reservoir at Metolius site, along with site preparation
	400 feet of 2" Galvanized - Plum Street
	4,300 feet of 6" PVC - Lee Street to Jefferson Street; Lee Street along Hwy 26 to Hoffy's and Juniper Motel
6 - 20 years	16" mainline from Metolius Reservoirs
	3,000,000 gallon Reservoir at the main Reservoir Site
	24" Discharge mainline from Opal Springs

Provided by Deschutes Valley Water District Master Plan, December 2000

- 24"Transmission Mainline

This mainline has a direct mitigating effect on the Metolius reservoir inlet pressure and available flow into the reservoirs. This project would allow all pipelines between the Main Reservoirs and the Metolius Reservoirs to have flow velocities within reasonable limits (less than 5 feet per second, even at peak hourly flow). Pressures throughout the District's pipeline network would also be maintained at sufficient levels until well after 2020. This transmission main is from the main reservoirs to Madras (Green Drive, Feather Drive, and Belmont Lane), which is approximately 16.5 miles in length. The current estimated cost for this project is \$7,000,000.

Routing this mainline from the Main Tanks to Round Butte and then to Madras gains the District several advantages. A bore of Hwy. 97 is avoided along with avoiding the previous routes of 8", 14" and 20" transmission mainlines. More area is available for storage on Round Butte. The Metolius Tank site will be crowded by the time another 3 MG reservoir is added in 2006. Water would be available along the new route. In general, the reliability of the District's system is improved if the new storage and the new mainline are away from the traditional corridor.

- 3,000,000 Gallon Reservoir at Round Butte



This reservoir will be constructed in conjunction with the proposed 24" Transmission Mainline. This reservoir is not to be confused with the pre-existing 110,000 gallon tank on Round Butte. The pre-existing tank has a hydraulic elevation of 3,079 feet and is for a boosted area serving 46 residences. The proposed 3 MG reservoir would have a hydraulic elevation of 2740 feet, which is the same as the Metolius Tanks. The Metolius Tanks and the proposed 3 MG Round Butte Tank would serve the largest population concentration of the District, which is the City of Madras and its outlying areas. The current estimate for construction of this project is \$900,000.

- 2,000,000 Gallon Reservoir at Metolius Site

This storage needs to be added depending on population growth, which will be highly dependent on the new state prison and its progress. The additional land for this reservoir has already been procured. This project has been delayed due to the proposed 3 MG reservoir on Round Butte. Also, the telemetry has been upgraded and in line meters added to the Metolius Tank Site. This has allowed more efficient use of the reservoirs by adjusting the pressure reducing/sustaining valves on the inlet side of the reservoirs. The current estimate for construction of this project is \$670,000.

- 16" Mainline to East side of Madras

This mainline will be dependent on the population growth. This mainline would begin at the new Metolius Tank and continue for 5 miles to the east side of Madras in the vicinity of "J" Street and Grizzly Road. Future growth around Madras will be concentrated on the east side, according to the City and County Comprehensive Land Use Plans. The current estimate for construction of this project is \$500,000.

- Main Reservoir Additional Storage

Another 3 million gallons of storage will be needed at the Main Reservoir site. This project is essentially for pure storage, for the whole district due to projected use by that time period. The current estimate for construction of this project is \$1,000,000.

- 24" Discharge Mainline from Opal Springs Pumphouse to Canyon Rim

This project will be required to increase capacity from the pumping facility to the Main Reservoirs and the distribution system. The capacity of the existing 12" and 20" discharge lines is 10,000 gpm. Based on median population growth, the average daily pumping rate required for 2005 will be 6320 gpm; for 2020, the required rate will be 11,450 gpm. No cost estimate has been calculated for this future project.

### Wastewater System:

The City's wastewater collection and treatment system [is managed in accordance with the 2018 Madras "Wastewater Master Plan"](#), which provides a long-range plan for the wastewater collection

and treatment system to meet the growing demand for sewer services. The plan relied on 2015 population and employment growth projections prepared by Portland State University. Forecast sewerage flows in the collection system and at the two treatment plants were based on these projections. The Master Plan includes an evaluation of the existing wastewater system, including collection, pumping and treatment components, as well as the need for system expansion. Planned capital improvements are designed to support the forecast growth and to address critical maintenance of the system.

[The above paragraph revised by Ordinance No. 918, Passed by Council on July 24, 2018.]

Madras began providing centralized WW service in 1975 with the construction of a collection system and WWTP. Since then, the City has constructed expansions that have reshaped these facilities. The main elements of the existing facilities serving Madras are listed below.

[The above paragraph revised by Ordinance No. 918, Passed by Council on July 24, 2018.]

- Two separate collection systems that receive and convey sewage to the City's two WWTPs. These include a Main Collection System serving most of the City and a smaller Industrial Park Collection System that serves the industrial/commercial area near the airport plus a group of residences north of Birch Lane and east of the Municipal Golf Course.
- Major components of the two collection systems include approximately 208,000 linear feet of gravity sewers, 878 manholes, five pump stations, and close to 43,800 linear feet of force mains.
- The North Wastewater Treatment Plant (NWWTP) near the airport relies on a facultative treatment lagoon and a holding pond to retain treated effluent.
- The South Wastewater Treatment Plants (SWWTP) relies on sequencing batch reactor system and a winter holding pond to retain treated effluent.
- Five major pump stations and pumping systems at the treatment plants.
- Piping systems that convey treated effluent to the storage ponds where it is held and recycled as irrigation water on farmland and the municipal golf course during warmer months.
- A supervisory control and data acquisition (SCADA) system that controls pumping stations and the mechanical equipment at the treatment plants.
- Onsite WW treatment and disposal systems on properties not served by or connected to a sewer.

Future improvements to the wastewater system are outlined in the following table. A more complete summary of the recommended capital improvements is included in the adopted Public Facility Plan (PFP) and in the WWMP.

[The above list and paragraph added by Ordinance No. 918, passed by Council on July 24, 2018.]

## CAPITAL IMPROVEMENT PROJECTS AND TIMING

WWTS Capital Improvements Summary Estimates of Probable Costs and Anticipated Timing <sup>1</sup>		
Project Description	Probable Construction Cost	Probable Project Cost
<b>A. Short-Term Projects (within 5 years)</b>		
1. Gravity Sewer Projects	\$ 2,703,000	\$ 3,650,000
2. Pump Station and Force Main Projects	None Identified	
3. WWTP and Effluent Recycling Projects	\$ 1,710,000	\$ 2,310,000
<b>Subtotal for Short-Term Projects</b>	<b>\$ 4,413,000</b>	<b>\$ 5,960,000</b>
<b>B. Longer-Term Projects (6 - 20 years)</b>		
1. Gravity Sewer Projects	\$ 2,418,000	\$ 3,264,000
2. Pump Station and Force Main Projects	\$ 2,974,000	\$ 4,020,000
3. WWTP and Effluent Recycling Projects	\$ 20,944,000	\$ 28,275,000
<b>Subtotal for Longer-Term Projects</b>	<b>\$ 26,336,000</b>	<b>\$ 35,559,000</b>
<b>C. Potential Industrial Site Readiness Projects</b>		
1. Gravity Sewer Projects	\$ 672,000	\$ 907,000
2. Pump Station and Force Main Projects	\$ 1,137,000	\$ 1,535,000
3. WWTP and Effluent Recycling Projects	\$ 34,612,000	\$ 46,760,000

<b>Subtotal for Long-Term Projects</b>	<b>\$ 36,421,000</b>	<b>\$ 49,172,000</b>
<b>Total Proposed &amp; Potential Capital Projects</b>	<b>\$ 67,170,000</b>	<b>\$ 90,691,000</b>

(1) Refer to WWMP Chapter 8 for basis of estimating probable costs.

[Ordinance No. 918, passed by Council on July 24, 2018, replaced the existing table titled "Future Projects and Timing" with the above table, and deleted the text and tables up to the section titled "Stormwater Drainage"]

## **STORM WATER DRAINAGE**

Management of storm water drainage serves several important purposes. One of the most obvious reasons for controlling storm water is to prevent or minimize localized flooding, which can occur where adequate drainage has not been provided. Another function of storm water control is to minimize the chance of water accumulating in the roadway and creating traffic hazards. Good drainage of streets will greatly increase pavement life. Moisture penetration of pavement is one of the leading causes of premature road surface failures.

The "Storm Drainage Capital Improvement Plan" was prepared using the best available information regarding existing conditions and historical events, as well as projections of storm water flows from future construction.

An attempt has been made to evaluate the entire City as a whole, since an impact such as a major change in run off characteristics due to development in one area will have significant effects downstream. Existing drainage patterns were used when considering the proposed projects so that water would follow its natural course as much as possible. Both observed drainage flows, as well as interpretations from U.S.G.S. contour maps were included in system design.

This plan is not a definitive document but is intended to provide a basic framework for planning and establishing guidelines for future development. The list of projects as well as the estimates of cost should be reviewed and revised as changing conditions and the needs of the City may dictate.

### **Projects and Estimates of Cost**

Projects as described in this plan were developed in conjunction with the City of Madras Storm Drainage System Map on file at the Madras Public Works Department. Each project listed includes a naturally defined segment of the overall system, which serves a specific area. The estimate of cost for each project reflects the cost of the entire segment. It is not proposed that the eventual construction of the system will exactly follow the order on the list or even the total segment. It may be desirable to construct only a small portion of any given project at any given point in time.

What may be of most value is consideration of the system as a whole and where the most critical needs may be. For instance, it may be most effective to concentrate on the downstream end of a drainage when development occurs at the upstream end of the system. Increased flows from the upper end of the drainage will surely arrive at the lower end and may cause problems if adequate allowance has not been provided. Also, when road resurfacing or rehabilitation work is considered, it might well be most cost effective to construct that portion of the drainage facility scheduled for the location even though the rest of the segment may not be scheduled until some future date. Another consideration would be where a road or driveway is to be constructed across a drainage. Careful adherence to the design of the proposed system facilities for such a crossing will assure future facilities will mesh and problems will be minimized.

Estimate of costs are in 1991 dollars and reflect total project construction costs including materials, labor, and equipment but do not include engineering or overhead costs, which may apply. The estimates are included as a planning tool for cost benefit analysis and to allow for equitable apportionment of Systems Development Charges based on the affect of any one project on the system as a whole.

The storm system as proposed, would serve the needs of existing streets and drainages at projected build-out. New streets and developments would require their own drainage systems, which would then tie into the proposed system. Credits for storm water facilities Systems Development Charges constructed with a project should be allowed only when those facilities constructed have been identified in this plan as it may be amended.

## **Projects**

The following storm drain projects and their timing, correspond to the City of Madras Storm Drainage System Map on file at the Madras Public Works Department.

TIMING	PROJECT
0-5 years	"I" Street
	"H" Street
	7th Street
	7th and Oak Street
	7th and 8th Streets North
	Henry Street
	Roosevelt Street
	Marshall and "H" Street
	Buff Street West
6-20 years	8th Street
	1st Street
	5th Street
	"J" Street
	6th Street
	2nd Street
	Celilo, Bard and S.E. storm drain
	Fairgrounds Road and Hwy 97S
	Marie, Olive and Fairgrounds West

	10th Street South including Glen Street
	"D" Street
	16th Street and "A" Street
	Hwy 97 North Extension
	Lincoln and Madison
	Buff Street East
	Highway 361 - Ruby to Madison

- "I" Street Storm Drain proposed to be located approximately 350 feet between Wade and Turner Streets for an estimated cost of \$7,150.
- "H" Street is proposed to have a storm drain placed approximately 400 feet between Commerce and Turner Streets for an estimated cost of \$7,210.
- 7th Street storm drain is proposed to be located at the intersection of Buff Street for an estimated cost of \$3,072.
- 7th and Oak Streets proposed storm drain is at the intersection for an estimated cost of \$10,747.
- 7th and 8th Streets North between Ebert and Turner Streets for an estimated cost of \$10,080.
- Henry Street storm drain proposed for placement between 8th and 10th Streets for an estimated cost of \$11,417.
- Roosevelt proposal is placed at the intersection of "G" Street for an estimated cost of \$4,740.
- Marshall and "H" Street storm drain placement at intersection for an estimated cost of \$4,940.
- Buff Street west for an approximate distance of 1100 feet for estimated cost of \$10,880.
- 8th Street improvement at the intersection of Buff Street for an estimated cost of \$28,940.
- 1st Street storm drain at the intersection of Hwy 97 for an estimated cost of \$28,253.
- 5th Street storm drain extension intersects with Buff Street for an estimated cost of \$26,225.
- "J" Street proposal is between 2nd and 4th Street for approximately 400 feet for an estimated \$11,350.
- 6th Street proposal is at the intersection of Buff Street for an estimated \$24,320.
- 2nd Street proposal is for an approximate distance of 950 feet south and then extending another 550 feet to Hwy 97 for an estimated \$169,330.

- Celilo, Bard and S.E. proposal for an approximate 1200 feet for an estimated \$62,264.
- Fairgrounds Road and Hwy 97 proposal for an approximate 1400 feet for an estimated \$14,220.
- Marie, Olive and Fairgrounds West proposal for an approximate 400 feet on each street for an estimated \$43,380.
- 10th Street south including Glen Street for a distance of 550 feet for an estimated \$64,317.
- "D" Street East for a distance of 850 feet for an estimated \$29,758.
- 16th Street and "A" Street for a distance of approximately 300 feet for an estimated \$38,670.
- Hwy 97 north extension for an approximate distance of 1100 feet for an estimated \$12,550.
- Lincoln and Madison proposal for an approximate distance of 525 feet for an estimated \$12,550.
- Buff Street East for an approximate 575 feet for an estimated \$21,365.
- Highway 361 - Ruby to Madison for an approximate distance of 100 feet between the streets for an estimated \$67,352.

### **Costs of Drainage Systems and System Development Charges**

In order to equitably apportion costs to new development, System Development Charges are proposed for all new construction. Since costs will vary with time, and the needs and conditions of the city will change, it is proposed that System Development Charges for drainage be established by resolution to permit more flexible adjustments in charges to coincide with the current conditions reflected in this document as it may be amended.

Since the estimate of costs to construct the storm drainage system is \$746,745.00, the population figures for the City of Madras in 1991 was 3,443 and the average number of occupants per residence was 2.43, and assuming there were approximately 1,417 single family dwelling units, the cost of the system improvements is divided by the number of single family dwelling units, we arrive at a cost per single family residence for drainage improvements of \$526.99.

It is reasonable to assume that since the residents of Madras have already constructed houses, parking lots, and other surfaces that increase storm water runoff above that of natural soils, that only future construction of such facilities will have a significant impact in increasing storm water flows above existing conditions. It is therefore proposed that System Development Charges for storm drainage be assessed to new construction to contribute to the financing of the capital improvements required.



Using the premise that an average single family dwelling may have a total of 3,000 square feet of impervious surfaces, we can use 3,000 square feet as a basis for estimating residential drainage equivalents or the amount of additional runoff expected from the construction of a house and appurtenant facilities.

Since there are some existing drainage problems within the City and there is always the possibility of obtaining grants and low interest loans for construction, it may be reasonable and prudent to set the charges for RDE's at some point below the maximum charge described.

The City will benefit greatly in terms of convenience, safety, and decreased maintenance costs from a well designed and integrated storm water management system. The proposed storm water control system will function to minimize adverse effects from the average storm event, but is not intended to provide for the catastrophic events of major flood occurrences. It would not be cost effective to design and build facilities capable of carrying every conceivable storm water flow. A well designed system will reduce a normally expected storm impact and will help assume rapid recovery from even catastrophic events.

## **POLICIES**

These policies are intended to be consistent with state law and existing City policies and practices, for promoting efficient and effective provision of urban services and protecting natural resources. The specific rationale for each policy is described in the table.

1. The City shall assure urban services (water, sewer and storm drainage services and transportation infrastructure) to residential, commercial and industrial lands within the City's Urban Growth Area as these lands are urbanized.

*Rationale: Identifies the City's responsibility to provide urban services to developed lands in the City. [UGAMA]*

*[Amended by Ordinance No. 754, Passed by Council on March 14, 2006]*

2. To minimize the cost of providing public services and infrastructure, the City shall discourage inefficient development without adequate public services and promote efficient use of urban and urbanizable land within the City's urban growth boundary, including requiring all urban development to be served by full urban services.

*Rationale: Protects against inefficient urban growth and also helps the City meet the intent of Goal 14. [UGAMA]*

*[Amended by Ordinance No. 754, Passed by Council on March 14, 2006]*

3. The City shall support development that is compatible with the City's ability to provide adequate public facilities and services.

Rationale: *Allows the City to keep growth from outpacing the City's ability to service the new development.* [UGAMA]

[Amended by Ordinance No. 754, Passed by Council on March 14, 2006]

4. The City shall prioritize development of land serviced by utilities and require the extension of water, sewer and storm drainage facilities for all urban level development within the UGB.

Rationale: *Promotes efficient urban growth and reduces the cost of providing services.* [UGAMA]

[Amended by Ordinance No. 754, Passed by Council on March 14, 2006]

5. The City shall coordinate provision of public services with annexation of land outside the City limits.

Rationale: *Helps coordinate annexation and public service policies.* [UGAMA]

[Amended by Ordinance No. 754, Passed by Council on March 14, 2006]

6. The City shall adopt long-range master plans for its water, sewer, storm drainage and transportation systems and review and/or update them periodically.

Rationale: *Regular review of master plans is important in identifying new infrastructure needs and ensuring adequate provision of urban services concurrent with growth.*

7. The City shall adopt and periodically update, as a supporting document to this Plan, a Public Facilities Plan, for development of public services and facilities in conformance with the policies of the comprehensive Plan. Significant changes in projected capacity of public facilities required by proposed new development to be served by the City may necessitate update of the Public Facilities Plan.

Rationale: *Links the Comprehensive Plan with the Public Facilities Plan, pursuant to state law.*

8. The City shall comply with state and federal regulations for utility systems.

Rationale: *Ensures the City complies with all applicable laws.*

9. The City shall establish and maintain a range of funding mechanisms for building new water, sewer, storm drainage and transportation infrastructure and maintaining existing infrastructure.

Rationale: *Helps ensure that there are adequate funds to maintain infrastructure and pay for new extensions.*

10. The City shall monitor the condition of water, sewer, storm drainage and transportation infrastructure and finance regular maintenance of these facilities.

Rationale: *Helps ensure that infrastructure is monitored and maintained.*

11. The City shall utilize its adopted System Development Charges (SDCs) to finance new water and wastewater infrastructure as allowed by state law, and adjust SDCs to keep them up- to-date with current costs.

Rationale: *Formalizes use of adopted SDCs for expansion and maintenance of infrastructure (wastewater, domestic water, stormwater drainage and transportation).*

12. The City shall establish and maintain utility rates and user fees that equitably allocate costs for operations and maintenance to users.

Rationale: *Establishes means of paying for utility infrastructure that is fair and efficient.*

13. The City shall maintain a supply of commercial and industrial land that is serviceable by water, sewer, storm drainage and transportation infrastructure.

Rationale: *Implements Goal 9, Economic Development, requirements.*

14. The City shall periodically amend its Comprehensive Plan (public facility projects) as implementing plans and agreements are updated

Rationale: *Implements rule requirements to amend the project list to include significant modifications and helps ensure the project list remains current.*

15. The City shall protect its domestic water supply by:

- coordinating with Deschutes Valley Water District (provider of domestic water within the city limits of Madras)

- working with landowners and managers for protection of water sources and adhering to applicable permitting requirements when approving new residential, commercial and industrial development and when constructing new water, sewer, storm drainage transportation infrastructure

Rationale: *Protecting the City's water supply is a key component to ensuring adequate water quality and quantity for residents.*

16. The City shall continue to dispose wastewater treatment effluent at the Desert Peaks Golf Course, and has secured additional publicly owned property that the City encourages to be developed as a golf course that is suitable for irrigation with treated wastewater effluent.

Rationale: *Disposal of treated wastewater effluent on publicly owned property is consistent with state policy encouraging the re-use of treated wastewater effluent. Additionally, it is a beneficial use of a waste product that reduces pressure on the City's water supply.*

[Amended by Ordinance No. 781, Passed by Council on December 12, 2006]

17. The City shall take steps to minimize adverse impacts from construction and other sources of erosion and sedimentation on natural drainage ways and storm drainage facilities.

Rationale: *Natural drainage ways are a crucial part of a City's overall storm drainage management infrastructure and long-term ecological health.*

18. In order to allow for safe, orderly and coordinated development, the City shall adopt utility and transportation design standards and construction specifications as part of its development Code.

Rationale: *Provides a link between the Comprehensive Plan, Transportation System Plan, and the City's Development Code.*

19. The City shall prepare 'industrial readiness' infrastructure plans (water, sewer, storm drainage, and transportation) for industrial lands near the airport that are subject to the City's adopted Airport Master Plan, Regional Large Lot Industrial Sites, and urban reserve areas in order to take advantage of economic development opportunities. These plans may address infrastructure needs for land that is outside of the inventory of land needed to meet a 20-year urbanizable land supply. As such the improvements to serve these areas are ancillary to the adopted Madras Public Facility Plan.

*Rational: Provides a basis for long range infrastructure systems planning for potential future urbanizable land beyond the mandatory planning addressed through the Comprehensive Plan, Transportation System Plan, Public Facility Plan, and the City's Development Code.*

[Section 19 added by Ordinance No. 918, passed by Council on 07-24-2018]

**Schools**

Madras is a part of Jefferson County School District 509-J. There are four schools in Madras. These are Madras Elementary (grades K-4), Buff Elementary (grades 5-6), Madras Junior High (grades 7-8), and Madras High (grades 9-12). Enrollment figures are as follows:

**AVERAGE DAILY MEMBERSHIP**

<u>School</u>	<u>1966-67</u>	<u>1977-78</u>
Kindergarten	--	91
Madras Elementary	480	437
Buff Elementary	229	235
Madras Junior High	362	405
Madras High	604	592

In October, 1977, a Citizens Advisory Committee (509-J) concluded their study with a written report to the school board. Their general comments concluded that all buildings in 509-J District can be serviceable for many years. This committee observation has been collaborated by the district architect. There was no observed crowding in terms of numbers of students per classroom. There is a problem in providing rooms for some classes and programs because of the number of classes offered. If the district enrollment continues to grow, it is likely that within a few years, new construction may be necessary. The committee endorsed the neighborhood school concept of maintaining elementary schools in Simnasho, Metolius, Madras, and Warm Springs.

**Hospitals, Medical, Health, Mental Health:**

Mountain View Hospital, a tax supported institution, has 70 licensed beds, 32 acute care and 2 intensive care, and a 36 bed nursing home. Rates are comparable with other hospitals of similar size and considerably lower than St. Charles Medical Center in Bend. Patient care is rated high and the hospital is fully accredited. An expansion of the nursing home wing is now completed.

There are five physicians, all engaged in general family practice, with four joined in a clinic operation. Needed specialist care is furnished to the entire Central Oregon area by specialists located in Bend at the St. Charles Medical Center.

The community is also served by five dentists and two optometrists. Jefferson County operates public health programs and mental health programs through the County Health Department and Mental Health Department. Both are comprehensive, well planned and operated programs.

### **Churches, Lodges, Farm Organizations:**

Churches located and holding services in Madras are the Christian, Baptist, Methodist, Episcopal, Church of Christ, Assembly of God, Lutheran, Catholic, Seventh Day Adventist, and others.

There are Masonic, Elk, Odd Fellow, Eastern Star, and Rebekah lodges in Madras. There are American Legion and Veterans of Foreign Wars posts in Madras. Jefferson County boasts three active granges and a County Farm Bureau in addition to the Madras-Jefferson County Chamber of Commerce, the Kiwanis Club, the Lions Club, and the Jefferson County Road and Gun Club.

### **TRANSPORTATION:**

#### **Regional Setting:**

The City of Madras lies in the approximate geographic center of Jefferson County. The City is served by several modes of transportation, including private auto, motor freight, rail, air, and commercial bus service. The City lies on the major North/South transportation corridor through Central Oregon.

#### **Highways:**

Two major federal highway routes form the framework of Madras' thoroughfare system. Highways U.S. 97 and 25 join at Madras and traverse through the heart of the County in a broad X-shaped pattern.

U.S. 26, locally known as the Warm Springs and Madras-Prineville Highways, is the main East-West highway serving Jefferson County. Most regional traffic in Jefferson County is routed into and through the City of Madras on Highways U.S. 97 and 26. In 1966, the Oregon State Highway Department introduced a one-way couplet in Madras (northbound on Fifth Street and southbound on Fourth Street).

Traffic on U.S. 97 North of Madras ranges from 1,100 vehicles per day at the Jefferson-Wasco County line to 8,800 vehicles at its junction with the Culver Highway in Madras. The traffic on U.S. 97 is heavier South of Madras, ranging from 6,600 vehicles per day at the South city limits of Madras to 3,000 vehicles per day at the Jefferson-Deschutes County line.

Other relatively high traffic counts were reported by the highway department on the Warm Springs and Madras-Prineville sections of U.S. 26. Average daily traffic on the Warm Springs Highway ranged between 1,700 vehicles per day at the Jefferson-Wasco County line, 2,900 vehicles at Warm Springs, and 5,300 vehicles at its junction with U.S. 97 North of Madras. The Madras-Prineville highway carried an average of about 650 vehicles per day over most of its length, although the count at its junction with U.S. 97 South of Madras amounted to 810 vehicles.



The other major federal-aid secondary highway, Culver Highway, was reported to have carried about 2,150 vehicles per day in Madras.

**Railroads:**

The Oregon Trunk Railroad, utilized by Burlington-Northern and Union Pacific Railroad Companies, provides daily freight service to Madras. A spur line of the Oregon Trunk line serves the Madras Industrial Park. The more frequent operation of trains in Jefferson County occurs within the Madras area. The Madras railroad station is the main depot and industrial switching yard in the County. The railroads now offer freight service only; passenger service was discontinued in the early 1970's.

Three groups of commodities dominate rail cargo movements through Jefferson County. They include commodities of agriculture (potatoes, wheat, and barley), forest commodities (plywood, lumber and studs), and energy sources (petroleum, fuel oil, and petroleum derivatives). Agricultural and forest commodities are chiefly outbound while energy sources are all inbound. Other major cargo movements include inbound farm machinery, commercial fertilizers, and feed.

Much of the rail traffic in the County is highly seasonal in nature. There is virtually no movement of potatoes from the first of June until late September. Commercial fertilizer is shipped into the County during the Spring and Fall months only.

Although rail freight moves in all directions from Madras shipping points, the greater share is destined for points east. It is estimated that about 90 percent of the plywood and lumber traffic is eastbound, and the Union Pacific carried nearly 98 percent of its potato shipments to eastern points. Conversely, the Burlington-Northern ships about 75 percent of its potatoes to California and the remainder to transcontinental points. Almost all of the Jefferson County grains (wheat and barley) are shipped to the Ports of Portland and Vancouver for export. Approximate rail freight transit times from Madras to select cities are shown in the following tabulation.

From Madras to:	Portland	2nd morning delivery
	San Francisco	3rd morning delivery
	Seattle	3rd morning delivery
	Kansas City	4th morning delivery
	Los Angeles	5th morning delivery
	Chicago	5th morning delivery

**Air Transportation:**

The major air transportation facility in Jefferson County is the Madras City-County Airport, located in the Madras Industrial area about three miles northwest of the city center. This field was first used by the U. S. Army during World War II as a training center for the B-17. The airport has four surfaced runways: two 8,000 foot runways, one 10,000 foot runway, and a 3,800 foot lighted runway. In addition, there are hangar and tie-down facilities for storage of light planes and a shop hangar for major aircraft repairs.

At the present time, Oregon Air Service (a commercial carrier) provides scheduled passenger service daily at the Madras City/County Airport. The airline provides direct connections with Eugene. A fixed base operator at the field offers charter flight service for air express, freight, and passenger transportation. Air service for light private planes, flight instruction, crop dusting, fertilizing, fire fighting and aircraft maintenance are also provided at this facility.

### **Bus Service:**

Madras is the only City in the County with scheduled bus service. An agency station of Pacific Trailways Bus System operates in a café depot at the corner of Sixth and "D" Streets. From this station, Trailways buses make a total of ten departures daily--four each to Portland and Bend, and two to The Dalles. In addition to regular passenger and charter services, Pacific Trailways also offers shipment of express freight from its station in Madras. The approximate bus transit times from Madras to selected centers is shown in the following tabulation.

From Madras to:	Bend	1 hour
	Portland	2 hours, 55 minutes
	The Dalles	2 hours, 15 minutes
	Klamath Falls	4 hours, 10 minutes
	Salt Lake City	17 hours, 30 minutes

### **Motor Freight:**

Trans-western Express, Cascade Transport, and Madras Freight Lines are the three main common carriers with offices in Jefferson County.

The Trans-western terminal is located on the Warm Springs Highway about one and one-half miles north of Madras. This firm maintains regular truck service from Madras to Portland and from Madras to Bend and points south. Trans-western is also the local agent for the Mayflower Moving and Storage Company.

Cascade Transport, whose main offices are in Bend, maintains a branch office and terminal in Madras. Cascade Transport is authorized as an unscheduled intra-state carrier.

The Madras Fright Lines terminal is located on the Dalles-California Highway one mile south of the Madras city limits. This carrier specializes in hauling livestock, feed, fertilizer, and building materials, and is generally considered to be one of the largest motor freight concerns of its kind in the Pacific Northwest. It is authorized as an interstate and intra-state irregular common carrier, operating to or from points in Eastern Oregon to or from points in Oregon, California, Washington, Idaho, and Nevada. Its authority to and from Nevada points is limited to the transport of livestock. Madras Freight Lines is also authorized to carry general freight within, to and from Jefferson-Crook-Deschutes County area, although this authority is seldom utilized.

Approximate motor freight transit lines from Madras and other Central Oregon shipping points to selected areas are as follows:

From Madras to:	Portland metropolitan area	1st morning
	Seattle-Tacoma	2nd morning
	San Francisco Bay area	2nd morning
	Southern California	3rd morning
	Lake states	8th morning
	East Coast	11th morning

**Local Transportation:**

The City of Madras is developed in a grid pattern with the streets lying in almost true north-south, east-west directions. Street rights-of-way vary from 80 feet to 60 feet and improved residential street widths are quite wide with some up to 54 feet curb-to-curb. Present city standards require new streets to have 60 feet of dedicated right-of-way with 44 feet of improved surface. Improvement standards are Oregon State Highway Department standards for an 0-9 oil mat. Sidewalks are not now required in new subdivisions but are available in most residential areas of the City through the formation of local improvement districts at property owner requests.

There is a taxi service available in the City; however, most intra-city transportation is via private automobile. The one way north-south couplet, established in 1966, has relieved severe congestion problems in the core area of the City. The Central Oregon Council on aging has established a Dial-a-Ride service for senior citizens.

There are several corrective measures, which the City will undertake to improve the traffic circulation in the area. These include:

- A. Construction of a bridge over Willow Creek to complete 10th Street. This will provide better access to and from a growing residential area to the north of the City.
- B. The intersection of northbound U.S. 97 and Adams Drive needs to be improved. The present "Y" situation creates a serious traffic hazard and can be easily corrected by turning Adams Drive sharply to a 90° intersection.
- C. Buff Street needs to be extended to Grizzly Road to provide better east-west circulation.
- D. Although the following needs are out of the City's jurisdiction, the City urges and fully supports:
  - 1. The placement of additional directional signs in the northbound lanes of 5th Street to announce the junction of Highways U.S. 26 and 97.
  - 2. The short "U" turn at the south end of the one-way couplet is too short and creates a traffic hazard. The construction of traffic island and slight relocation to the north of the east-west lanes would greatly enhance the situation.
  - 3. The addition of a stoplight on one intersection of both north and south bound lanes of the one-way couplet would be of tremendous benefit by slowing through traffic and easing east-west traffic movement. A suggested location to be considered is 5th and "D" Streets and 4th and "D" Streets. This should be done when traffic volumes reach sufficient numbers to meet state standards for traffic light installation.

During the formulation of this plan, serious consideration was given to the establishment of a highway bypass around the City. It is the City's official position to oppose any relocation of the existing highway through the City at the present time.

## **ENERGY:**

There are no energy resources within the planning area. Electrical power is provided by Pacific Power and Light Company. Power is generated at Round Butte and Pelton Dams. Energy conservation can be accomplished in a variety of ways. Other elements of this plan indicate several methods by which the City is responding to the need to conserve energy. Some of these methods include the establishment of an Urban Growth Boundary to prevent urban sprawl and the inherent waste of energy resources associated with sprawl. Strict adherence to the Uniform Building Code to maintain proper insulation of homes is also effective in the conservation of energy. The use of vacant lots within the existing city limits prior to developing raw land will also save energy by reducing costs of constructing and maintaining additional public services.

The development of alternative energy sources, such as solar energy will be supported by the City. Further, the City supports the development of a waste recycling center within the planning area.

## **URBANIZATION:**

The City, in cooperation with Jefferson County, shall establish an Urban Growth Boundary. The purpose of the Urban Growth Boundary is to separate urbanizable land from rural agricultural land. Urban lands are defined as those lands within the Urban Growth Boundary which (1) are determined to be necessary and suitable for future urban areas; (2) can be served by urban services and facilities; and (3) are needed for the expansion of an urban area.

Agricultural lands are defined as those lands having soil types in Class I through VI in Eastern Oregon as classified by the Soil Capability Classification system of the United States Soil Conservation Service.

At the outset of the planning process, both the City and the County Planning Commission began determinations for the establishment of an Interim Urban Growth Boundary. It became apparent after a series of public meetings that the concept of an Urban Growth Boundary would be difficult for the residents of the area to accept. In reviewing the existing situation, it was noted the County zoned a large area around the City of Madras to A-3 "Limited Agriculture" in 1973. This was done with the assistance of an Area Advisory Committee and has been in effect for approximately five years. At each public meeting the subject of the Urban Growth Boundary was discussed and the members of the public audience pointed to the 1973 "A-3" zoning and insisted this constituted an Urban Growth Boundary. Because of the large public sentiment regarding the Urban Growth Boundary, the process to establish it has been a long and difficult task. What follows is a discussion and analysis of the present County zoning and the established Urban Growth Boundary.

## **Jefferson County "A-3" Zoning Area:**

The Limited Agricultural "A-3" area contains 8,524 acres. That area includes the existing city limits of Madras, which contains some 750 acres, and the proposed Urban Growth Boundary area which contains an additional 1,400 acres, leaving a total of 6,474 acres presently zoned "A-3", Limited Agriculture. This area was considered by many residents to be urbanizable without the provision of sanitary sewer service. An analysis of the 6,474 acres was conducted and the following findings were determined.

- A. The entire area is served by the Deschutes Valley Water, a public water district, which is both federally and state approved, with the capabilities of providing adequate domestic water for intensive development throughout the entire area.
- B. There are several existing subdivisions within the area as well as dozens of individual home sites. A survey of existing land use indicated approximately 150 homes within this area.
- C. The North Unit Irrigation District maps indicate that of the 6,474 acres, approximately 3,300 have the right to receive irrigation water for agricultural purposes. However, not all of these lands are currently being utilized for agricultural production.
- D. The soils maps of the County indicate suitable soils for agricultural production to the east of the A-3 designated area. However, these areas need water to be utilized for agricultural purposes.
- E. The North Unit Irrigation District would be able to transfer water rights to land lying to the east. However, a new distribution system would be required.
- F. Nonbuildable lands were inventoried and it was found that approximately 1,500 acres were considered nonbuildable due to established flood plains, steep slopes, and road and irrigation rights-of-way.
- G. It is considered improbable that sanitary sewer service would ever be extended to this area by the City of Madras.
- H. Jefferson County Court has indicated that it will not allow residential development on irrigated agricultural lands within this area.

Based on the above findings, it was decided by the Planning Commission and governing bodies of the two jurisdictions involved to develop an Urban Growth Boundary inside the boundary established by the A-3 agricultural zoning in 1973. This decision was made after several public hearings at which heated debate took place. A proposal to include all the A-3 area in the Urban Growth Boundary was submitted to the LCDC field representative for review. The field Representative determined that the proposal would not meet the statewide planning goals. Therefore, over the strenuous objections of the members of the Area Advisory Committee, the governing bodies' decision was that the inclusion of the entire A-3 "Limited Agricultural" area would not meet the statewide planning goal for urbanization and would not meet the statewide planning goals for agricultural lands. Therefore, the smaller Urban Growth Boundary as described below was established.

## **URBAN GROWTH BOUNDARY DESCRIPTION AND ANALYSIS**

The Urban Growth Boundary as indicated on the Urban Area Comprehensive Plan and Zone Map. This section summarizes from data and analysis presented in Chapters 2 through 5 to compare “demonstrated need” for vacant buildable land with the supply of such land currently within the Madras UGB and city limits. Chapter 2 described population and employment forecasts, Chapter 3 described land supply, Chapter 4 described residential land needs, and Chapter 5 described land needed for employment. The following section estimates land needed for other uses; the chapter concludes with a comparison of land supply and land demand for the 2007-2027 and 2007-2057 time periods.

### **Land Needed for Other Uses**

Cities need to provide land for uses other than housing and employment. Public facilities such as schools, hospitals, governments, churches, parks, and other non-profit organizations will expand as population increases. Many communities have specific standards for parks. School districts typically develop population projections to forecast attendance and need for additional facilities. All of these uses will potentially require additional land as a city grows.

Previous sections estimated land demand for housing and employment; this section considers other uses that consume land and must be included in land demand estimates. Demand for these lands largely occurs independent of market forces. Many can be directly correlated to population growth.

For the purpose of estimating land needed for other uses, these lands are classified into three categories:

- Lands needed for public operations and facilities. This includes lands for city offices and maintenance facilities, schools, state facilities, substations, and other related public facilities. Land needs are estimated using acres per 1,000 persons for all lands of these types plus acreage needed for a specifically identified public need (160 acres for wastewater effluent disposal, as described in the wastewater system master plan).
- Lands needed for parks and open space. The estimates use a parkland standard of 7.5 acres per 1000 persons as described in Table 2, page 5 of the 2004 City of Madras Parks and Open Space Master Plan.
- Lands needed for semi-public uses. This includes hospitals, churches, non-profit organizations, and related semi-public uses. The analysis includes land need assumptions using acres per 1,000 persons for all lands of these types.

Public and semi-public uses occur in most plan designations in Madras. Table 6-1 shows public and semi-public land uses by generalized plan designation. The data show that 39% of the City's public and semi-public uses occur within lands designated for residential uses. Another 34% occurs in lands designated for agricultural uses (all these lands are outside the City limit, but inside the UGB). About 20% are in park/open space designations (including schools).

**Table 6-1. Summary of public and semi-public uses by generalized plan designation, Madras, 2006**

<b>General Plan Designation</b>	<b>Total Acres</b>	<b>Percent of Acres</b>
Agricultural	239.5	34%
Commercial	36.1	5%
Industrial	22.9	3%
Park/Open Space	138.9	19%
Residential	276.1	39%
<b>Total</b>	<b>713.5</b>	<b>100%</b>

Source: Jefferson County GIS data, analysis by ECONorthwest Note: Does not include vacant parcels in the Airport Industrial Park.

Table 6-2 shows land in public and semi-public uses by type. The data show that Madras had a total of 714 acres in public and semi-public uses in 2006. This equates to about 123 acres per 1000 persons. The largest uses were the City of Madras, the Madras School District, Jefferson County, and the State of Oregon. This is a high ratio of public land compared to other comparable sized communities.

Table 6-2 also shows assumed need for public and semi-public land. The assumed need will be applied to population to estimate future lands needed for public and semi-public uses. Not all types of uses have assumed land needs. For example, we did not allocate any land need to County, Federal, State, and Other uses. Thus, the assumed need is 0.

The estimates in Table 6-2 suggest that Madras will need more than 182 acres for public and semi-public uses between 2006 and 2026 and 586 acres between 2006 and 2056. In the 2006-2026 planning period, the City will need about 75 acres for schools, 55 acres for parks, 43 acres for churches, and 3.5 acres for fraternal organizations. The other land need includes 160 acres of open space for effluent disposal. Recent amendments to the City's comprehensive plan identify the desire for a golf course and location for effluent disposal in the UGB. This use is included in the land need estimates shown in Table 6-2.

**Table 6-2. Summary of public and semi-public uses by type, and estimated land need, Madras, 2007-2027 and 2007-2057**

<b>Use</b>	<b>Acres (2006)</b>	<b>Acres / 1000 Persons</b>	<b>Assumed Land Need (Ac / 1000 persons)</b>	
			<b>2006-2026 Land Need</b>	<b>2006-2056 Land Need</b>
Church	39.9	6.9	6.9	156.1
City Parks	251.5	43.4	7.5	169.6
Golf Course/Effluent Disposal	na	na	na	160.0
County	146.9	25.3	0.0	0.0
Federal	48.7	8.4	0.0	0.0
Fraternal	3.3	0.6	0.6	13.6
Other	56.6	9.8	0.0	0.0
School	150.5	26.0	12.0	271.4
State	16.1	2.8	0.0	0.0
<b>Total</b>	<b>713.5</b>	<b>123.0</b>	<b>29.4</b>	<b>770.7</b>



## Summary of Land Need and Demand

Table 6-3 shows total land demand for the 2007 to 2027 and 2007 to 2057 periods. [The results for the 2007 to 2027 period are superseded by the forecasts for housing growth in the Madras 2023-2043 Housing Capacity Analysis report and the results for employment growth are superseded by the Madras Economic Opportunities Analysis Update report.](#)

The results lead to the following findings:

- Total land demand for all uses is estimated to be 1,504 gross buildable acres for the 2007-2027 period and 4,307 gross buildable acres for the 2007-2057 period.
- The City will need about 636 gross acres for residential uses between 2007 and 2027 and 1,938 gross acres for residential uses between 2007 and 2057.
- The City will need about 511 gross acres for employment between 2007 and 2027 and 1,598 gross acres between 2007 and 2057.
- The City will need about 358 gross acres for public and semi-public uses between 2007 and 2027 and 771 gross acres between 2007 and 2057.

**Table 6-3. Estimated total land need, Madras UGB, 2007-2027 and 2007-2057  
Land Need (Gross Acres)**

Note: The results for the 2007 to 2027 period are superseded by the forecasts for housing growth in the Madras 2023-2043 Housing Capacity Analysis report and the results for employment growth are superseded by the Madras Economic Opportunities Analysis Update report.

<b>Land Use</b>	<b>2007-2027</b>	<b>2007-2057</b>
<b>Residential</b>		
Single-family detached	497.5	1,532.1
Manufactured	49.8	143.8
Condo/Townhomes	26.9	82.7
Multifamily	61.7	179.4
<b>Subtotal - Residential</b>	<b>635.8</b>	<b>1,938.1</b>
<b>Non-Residential (Employment)</b>		
Commercial	143.1	452.0
Industrial	251.4	749.9
Public	116.1	396.5
<b>Subtotal - Non-Residential</b>	<b>510.7</b>	<b>1598.3</b>
<b>Other (Public/Semi-Public)</b>		
Church	50.7	156.1
City (Parks/Other)	215.1	329.6
Fraternal	4.4	13.6
Schools	88.1	271.4
<b>Subtotal - Public/Semi-Public</b>	<b>358.3</b>	<b>770.7</b>
<b>Total Land Need</b>	<b>1,504.8</b>	<b>4,307.1</b>

Source: ECONorthwest

### Comparison of Supply and Demand

Table 6-4 compares land supply and demand for Madras by generalized zoning. The results for the 2007 to 2027 period are superseded by the forecasts for housing growth in the Madras 2023-2043 Housing Capacity Analysis report and the results for employment growth are superseded by the Madras Economic Opportunities Analysis Update report. The results show that Madras has a small deficit of lands for the 2007- 2027 period and a significant deficit during the 2007-2057 period. Following are a few preliminary implications:

- Madras has an immediate need to expand its UGB for housing and commercial (retail and services) land.
- Madras will need land in all designations to provide a 50-year urban reserve area.
- The analysis identifies a deficit of residential land for housing in two of the three city residential zones for the 2007-2027 period.
- The analysis identified a deficit of housing that is commensurate to households in the Upper Middle and High (MFI) income range.

- The City has 358 acres of land need for public and semi-public uses such as schools and parks during the 2007 to 2027 period and 771 acres during the 2007-2057 period.
- The estimates identify a deficit of commercial lands of 142 acres for the 2007 to 2027 period and 731 acres for the 2007 to 2057 period. More than half this land will be needed for employment uses other than retail.
- The estimates identify a surplus of 46 acres of industrial land for the 2007-2027 period and a deficit of 453 acres for the 2007 to 2057 period.

**Table 6-4. Comparison of land supply and demand, Madras UGB, 2007-2027 and 2007-2057**

The results for the 2007 to 2027 period are superseded by the forecasts for housing growth in the Madras 2023-2043 Housing Capacity Analysis report and the results for employment growth are superseded by the Madras Economic Opportunities Analysis Update report.

Plan Designation	Land Demand		Supply	Surplus (deficit)	
	2007-2027	2007-2057	2007	2007-2027	2007-2057
<b>Residential</b>					
R-1	451.9	1,355.7	398.1	(53.8)	(957.6)
R-2	46.1	138.2	23.5	(22.5)	(114.6)
R-3	148.0	444.0	242.8	94.8	(201.2)
RR5	0.0	0.0	32.7	32.7	32.7
RR10	0.0	0.0	47.5	47.5	47.5
RL	0.0	0.0	38.7	38.7	38.7
Public/Semi-public uses on res land	358.3	770.7	0.0	(358.3)	(770.7)
<b>Subtotal (Residential)</b>	<b>1,004.2</b>	<b>2,708.6</b>	<b>783.3</b>	<b>(220.9)</b>	<b>(1,925.3)</b>
<b>Commercial (Retail &amp; Services)</b>					
C-1	230.6	758.1	80.2	(150.4)	(677.9)
NC	28.6	90.4	4.9	(23.7)	(85.4)
CC	0	0	32.6	32.6	32.6
<b>Subtotal Commercial</b>	<b>259.2</b>	<b>848.5</b>	<b>117.7</b>	<b>(141.5)</b>	<b>(730.8)</b>
<b>Industrial</b>					
I	<b>251.4</b>	<b>749.9</b>	<b>296.9</b>	<b>45.5</b>	<b>(452.9)</b>

Notes: all public and semi-public land needs were allocated to residential zones

[The information in this section has been added by Ordinance No. 797 - passed by City Council on December 11, 2007]

**COMPREHENSIVE PLAN AMENDMENT**  
**ADDENDUM #2**  
**PERIODIC REVIEW WORK TASK #1 A & B**  
**ADOPTED BY ORDINANCE #703, JANUARY 14, 2003**

## SECTION III

### GOALS AND POLICIES

**GOAL 1** - To develop a Citizen Involvement program that insures the opportunity for all citizens to be involved in all phases of the planning process.

POLICY - The City shall insure an adequate citizen involvement in all phases of the planning process. To that end, the citizen involvement program is spelled out on Pages 14 and 15 of this plan.

**GOAL 2** - To establish a land use planning process and policy framework as a basis for all decisions and actions related to the use of the land and to insure an adequate factual base for such decisions and actions.

POLICIES - A. The City and County shall insure that the Comprehensive Plan serves as a basis for future land use decision.

B. The City and County shall be responsive to the changes in needs and conditions over time and amend the plan accordingly. The amendment process is discussed in the Land Use element.

C. The land use plan map and zoning maps for properties within in the Madras Urban Growth Boundary are the same. The City and County will work to adopt common zones for land in the UGB to provide certainty for property owners regarding the intended future urban use for all lands in the boundary.

D. The City and County shall adopt procedures that enable land with common city and county zoning to be annexed to the city using a streamlined rezone application process so long as the common zoning remains in effect.

[Goal 2 Amended by Ordinance No. 889, passed by Council on June 14, 2016]

**GOAL 3** - To preserve and maintain agricultural lands.

POLICIES - A. To establish an Urban Growth Boundary to separate rural lands from urbanizable lands.

B. Encourage establishment of exclusive farm use zoning outside the established Urban Growth Boundary.

**GOAL 4** - To conserve forest lands for forest uses. Due to the absence of any forest lands within the planning area, the City finds this Statewide Planning Goal inappropriate for the City.

**GOAL 5** - To conserve open space and protect natural resources.

POLICIES - The City shall:

- A. Preserve the scenic vistas afforded by the Cascade Mountain Range.
- B. The City will limit conflicting uses of identified historic structures and establish ~~a Zoning Ordinance~~ Development Code procedures to review applications for proposed changes.
- C. Continue to support and cooperate with the Jefferson County Museum Association.
- D. The City shall appoint the Jefferson County Museum Association as an advisory body to review historic sites, including any that should be identified at a later date.
  - 1) If a potential historic structure is proposed to be demolished, the City may, on recommendation from the Museum Association, hold in abeyance the demolition permit for up to sixty (60) days to allow the Museum Association to seek funds to preserve the potential historic structure or recommend other ways of preserving the structure.
- E. Locatable structures and definable sites should be listed in the Comprehensive Plan and shown on a map in the Jefferson County Museum. These sites and buildings should be protected by plan policies and ordinance provisions. They should, over time, become identified at the site to increase their historic value to the public.

[Added by Ordinance No. 780, Passed by Council on December 12, 2006]

- F. A special effort will be undertaken by the society and the City Planning Department to locate and document all historic cemeteries and family burial plots in the county. These sites are of particular interest to relatives of early settlers.

[Added by Ordinance No. 780, Passed by Council on December 12, 2006]

- G. Locations which cannot be well defined, or for which no visible remains exist, shall be marked on a map in the museum, along with an explanation of the events or structures which were on the location.

[Added by Ordinance No. 780, Passed by Council on December 12, 2006]



**RESOURCE SITE NAME:** ELLIS WILLIAMS HOUSE 1910 (Mason House)

**TYPE OF RESOURCE:** Historic Structure (SHPO 1976)

**LOCATION:** 508 Fifth Street - Madras

**DESCRIPTION (if available)** Two & one-half story residential structure in City of Madras. Not under County jurisdiction - See Madras Comprehensive Plan

**1-A** Sufficient information available to indicate resource site important

           Yes                                 No

If yes proceed to 1-B, if no, designate site 1-A, no further action.

**1-B** Information available, if sufficient to identify resource, proceed to 1-C. If insufficient, designate 1-B.

1-B action as follows \_\_\_\_\_

**1-C** Information sufficient to identify location, quantity, and quality of resource:

Location \_\_\_\_\_

Quantity \_\_\_\_\_

Quality \_\_\_\_\_

Proceed to 2.

**2** Conflicting Uses \_\_\_\_\_

**2-A** If conflicting uses identified, proceed to 2-B. If no conflicting uses designate site 2-A.

**2-B** ESEE Analysis

E \_\_\_\_\_

S \_\_\_\_\_

E \_\_\_\_\_

E \_\_\_\_\_

Proceed to 3.

**3** Program for Resource Protection

**3-A** Preserve Site Program \_\_\_\_\_

**3-B** Allow Conflicting Use \_\_\_\_\_

**3-C** Limit Conflicting Use \_\_\_\_\_

NUMBER CIRCLED IN MARGIN INDICATES DESIGNATION OF THIS SITE.

**RESOURCE SITE NAME:** HOBSON HOTEL 1909 (Madras Hotel)  
**TYPE OF RESOURCE:** Historic Structure (SHPO 1976)  
**LOCATION:** 4th and "C" Street - Madras

**DESCRIPTION (if available)** Three story wood frame building in City of Madras. Not under County jurisdiction. - See Madras Comprehensive Plan.

**1-A** Sufficient information available to indicate resource site important  
\_\_\_\_\_ Yes \_\_\_\_\_ No

If yes proceed to 1-B, if no, designate site 1-A, no further action.

**1-B** Information available, if sufficient to identify resource, proceed to 1-C. If insufficient, designate 1-B.

1-B action as follows \_\_\_\_\_  
\_\_\_\_\_

**1-C** Information sufficient to identify location, quantity, and quality of resource:

Location \_\_\_\_\_

Quantity \_\_\_\_\_

Quality \_\_\_\_\_

Proceed to 2.

**2** Conflicting Uses \_\_\_\_\_  
\_\_\_\_\_

**2-A** If conflicting uses identified, proceed to 2-B. If no conflicting uses designate site 2-A.

**2-B** ESEE Analysis

E \_\_\_\_\_

S \_\_\_\_\_

E \_\_\_\_\_

E \_\_\_\_\_

Proceed to 3.

**3** Program for Resource Protection

**3-A** Preserve Site Program \_\_\_\_\_  
\_\_\_\_\_

**3-B** Allow Conflicting Use \_\_\_\_\_  
\_\_\_\_\_

**3-C** Limit Conflicting Use \_\_\_\_\_  
\_\_\_\_\_

NUMBER CIRCLED IN MARGIN INDICATES DESIGNATION OF THIS SITE.

**RESOURCE SITE NAME:** I.O.O.F. Hall 1917

**TYPE OF RESOURCE:** Historic Structure (SHPO 1976)

**LOCATION:** 5th and "D" Streets - Madras

**DESCRIPTION (if available)** Two story brick building - In City of Madras, not under County jurisdiction. See Madras Comprehensive Plan.

**1-A** Sufficient information available to indicate resource site important  
\_\_\_\_\_ Yes \_\_\_\_\_ No

If yes proceed to 1-B, if no, designate site 1-A, no further action.

**1-B** Information available, if sufficient to identify resource, proceed to 1-C. If insufficient, designate 1-B.

1-B action as follows \_\_\_\_\_  
\_\_\_\_\_

**1-C** Information sufficient to identify location, quantity, and quality of resource:

Location \_\_\_\_\_

Quantity \_\_\_\_\_

Quality \_\_\_\_\_

Proceed to 2.

**2** Conflicting Uses \_\_\_\_\_  
\_\_\_\_\_

**2-A** If conflicting uses identified, proceed to 2-B. If no conflicting uses designate site 2-A.

**2-B** ESEE Analysis

E \_\_\_\_\_

S \_\_\_\_\_

E \_\_\_\_\_

E \_\_\_\_\_

Proceed to 3.

**3** Program for Resource Protection

**3-A** Preserve Site Program \_\_\_\_\_  
\_\_\_\_\_

**3-B** Allow Conflicting Use \_\_\_\_\_  
\_\_\_\_\_

**3-C** Limit Conflicting Use \_\_\_\_\_  
\_\_\_\_\_

NUMBER CIRCLED IN MARGIN INDICATES DESIGNATION OF THIS SITE.

**RESOURCE SITE NAME:** JEFFERSON COUNTY COURTHOUSE #1 (1918)

**TYPE OF RESOURCE:** Historic Structure (SHPO 1976)

**LOCATION:** 5th and "D" Street - Madras

**DESCRIPTION (if available)** Two story brick building ca. 1917. Arched recessed entry way facade is in good condition, and reads "Madras City Hall, 1917" Still in use as governmental building. Owned by Jefferson County.

**1-A** Sufficient information available to indicate resource site important

X  Yes   No

If yes proceed to 1-B, if no, designate site 1-A, no further action.

**1-B** Information available, if sufficient to identify resource, proceed to 1-C. If insufficient, designate 1-B.

1-B action as follows \_\_\_\_\_

**1-C** Information sufficient to identify location, quantity, and quality of resource:

Location 6th and "D" Street, Madras. Owned by Jefferson County, but inside Madras City limits.

Quantity Two story building

Quality Good structural quality - Remodeled inside, exterior in original condition

Proceed to 2.

**2** Conflicting Uses None - County ownership is sufficient to protect resource.

**(2-A)** If conflicting uses identified, proceed to 2-B. If no conflicting uses designate site 2-A.

**2-B** ESEE Analysis

E \_\_\_\_\_

S \_\_\_\_\_

E \_\_\_\_\_

E \_\_\_\_\_

Proceed to 3.

**3** Program for Resource Protection

**3-A** Preserve Site Program \_\_\_\_\_

**3-B** Allow Conflicting Use \_\_\_\_\_

**3-C** Limit Conflicting Use \_\_\_\_\_

NUMBER CIRCLED IN MARGIN INDICATES DESIGNATION OF THIS SITE.

RESOURCE SITE NAME: JEFFERSON COUNTY JAIL 1918

TYPE OF RESOURCE: Historic Structure

LOCATION: 6th and "D" Street - Madras

DESCRIPTION (if available) One story concrete building with a dome roof, iron door and three small windows with iron shutters - owned by Jefferson County - Designated in Madras Comprehensive Plan.

1-A Sufficient information available to indicate resource site important

X  Yes   No

If yes proceed to 1-B, if no, designate site 1-A, no further action.

1-B Information available, if sufficient to identify resource, proceed to 1-C. If insufficient, designate 1-B.

1-B action as follows \_\_\_\_\_  
\_\_\_\_\_

1-C Information sufficient to identify location, quantity, and quality of resource:

Location 6th & "D" Street, Madras, owned by Jefferson County

Quantity One small building with dome roof

Quality Good structural condition. Marked with plaque reading "Old County Jail July 3, 1918"  
Proceed to 2.

2 Conflicting Uses Designated in Madras Comprehensive Plan, County ownership sufficient to protect resource.

(2-A) If conflicting uses identified, proceed to 2-B. If no conflicting uses designate site 2-A.

2-B ESEE Analysis

E \_\_\_\_\_

S \_\_\_\_\_

E \_\_\_\_\_

E \_\_\_\_\_

Proceed to 3.

3 Program for Resource Protection

3-A Preserve Site Program \_\_\_\_\_

3-B Allow Conflicting Use \_\_\_\_\_

3-C Limit Conflicting Use \_\_\_\_\_

NUMBER CIRCLED IN MARGIN INDICATES DESIGNATION OF THIS SITE.

**RESOURCE SITE NAME:** MADRAS CONSERVATIVE BAPTIST CHURCH

**TYPE OF RESOURCE:** Historic Structure (SHPO 1976)

**LOCATION:** 802 "D" Street - Madras

**DESCRIPTION (if available)** One story building with high pitch gable roof, and a large bell tower. In City of Madras, not under County jurisdiction. See Madras Comprehensive Plan

**1-A** Sufficient information available to indicate resource site important  
\_\_\_\_\_ Yes \_\_\_\_\_ No

If yes proceed to 1-B, if no, designate site 1-A, no further action.

**1-B** Information available, if sufficient to identify resource, proceed to 1-C. If insufficient, designate 1-B.

1-B action as follows \_\_\_\_\_  
\_\_\_\_\_

**1-C** Information sufficient to identify location, quantity, and quality of resource:

Location \_\_\_\_\_

Quantity \_\_\_\_\_

Quality \_\_\_\_\_

Proceed to 2.

**2** Conflicting Uses \_\_\_\_\_  
\_\_\_\_\_

**2-A** If conflicting uses identified, proceed to 2-B. If no conflicting uses designate site 2-A.

**2-B** ESEE Analysis

E \_\_\_\_\_

S \_\_\_\_\_

E \_\_\_\_\_

E \_\_\_\_\_

Proceed to 3.

**3** Program for Resource Protection

**3-A** Preserve Site Program \_\_\_\_\_  
\_\_\_\_\_

**3-B** Allow Conflicting Use \_\_\_\_\_  
\_\_\_\_\_

**3-C** Limit Conflicting Use \_\_\_\_\_  
\_\_\_\_\_

NUMBER CIRCLED IN MARGIN INDICATES DESIGNATION OF THIS SITE.

**RESOURCE SITE NAME:** MADRAS DESCHUTES RAIL ROAD DEPOT 1911

**TYPE OF RESOURCE:** Historic Structure (SHPO 1976)

**LOCATION:** Birch Lane crossing of O.T.R.R.

**DESCRIPTION (if available)** Wood frame depot - in Madras U.G.B. See Madras Comprehensive Plan

**1-A** Sufficient information available to indicate resource site important

           Yes            No

If yes proceed to 1-B, if no, designate site 1-A, no further action.

**1-B** Information available, if sufficient to identify resource, proceed to 1-C. If insufficient, designate 1-B.

1-B action as follows \_\_\_\_\_  
\_\_\_\_\_

**1-C** Information sufficient to identify location, quantity, and quality of resource:

Location \_\_\_\_\_

Quantity \_\_\_\_\_

Quality \_\_\_\_\_

Proceed to 2.

**2** Conflicting Uses \_\_\_\_\_  
\_\_\_\_\_

**2-A** If conflicting uses identified, proceed to 2-B. If no conflicting uses designate site 2-A.

**2-B** ESEE Analysis

E \_\_\_\_\_

S \_\_\_\_\_

E \_\_\_\_\_

E \_\_\_\_\_

Proceed to 3.

**3** Program for Resource Protection

**3-A** Preserve Site Program \_\_\_\_\_  
\_\_\_\_\_

**3-B** Allow Conflicting Use \_\_\_\_\_  
\_\_\_\_\_

**3-C** Limit Conflicting Use \_\_\_\_\_  
\_\_\_\_\_

NUMBER CIRCLED IN MARGIN INDICATES DESIGNATION OF THIS SITE.



RESOURCE SITE NAME: PIONEER HOMESTEAD ON FAIRGROUNDS

TYPE OF RESOURCE: Historic Structure (Jefferson County Comprehensive Plan)

LOCATION: County Fairgrounds

DESCRIPTION (if available) One small wood frame residence, L shaped with one and one - half story in one portion, Board and Batten siding, porch and roof over entryway. Shutters on all windows, Windmill and storage barn included on site.

1-A Sufficient information available to indicate resource site important

X  Yes   No

If yes proceed to 1-B, if no, designate site 1-A, no further action.

1-B Information available, if sufficient to identify resource, proceed to 1-C. If insufficient, designate 1-B.

1-B action as follows \_\_\_\_\_

1-C Information sufficient to identify location, quantity, and quality of resource:

Location Jefferson County Fairgrounds

Quantity One resited and preserved pioneer homestead with split rail fence perimeter

Quality Good

Proceed to 2.

2 Conflicting Uses None - site maintained by Jefferson County Historical Society, owned by Jefferson County.

(2-A) If conflicting uses identified, proceed to 2-B. If no conflicting uses designate site 2-A.

2-B ESEE Analysis

E \_\_\_\_\_

S \_\_\_\_\_

E \_\_\_\_\_

E \_\_\_\_\_

Proceed to 3.

3 Program for Resource Protection

3-A Preserve Site Program \_\_\_\_\_

3-B Allow Conflicting Use \_\_\_\_\_

3-C Limit Conflicting Use \_\_\_\_\_

NUMBER CIRCLED IN MARGIN INDICATES DESIGNATION OF THIS SITE.

[List of Historical Resources added by Ordinance No. 780, Passed by Council on December 12, 2006]

**GOAL 6** - To maintain and improve the quality of the air, water, and land resources of the City.

- POLICIES -
- A. All new construction within the City shall be connected to the City's municipal sewer system.
  - B. The City shall strive to maintain state and federal standards for water quality.
  - C. That the City shall require all development to comply with all applicable state and federal environmental rules, regulations, and standards.

**GOAL 7** - To protect life and property from natural disasters and hazards.

This portion of the City of Madras Comprehensive Plan fulfills Oregon's statewide planning Goal 7 requirement. The purpose of Goal 7 is to reduce risk to people and property from natural hazards. In an effort to reduce risk, Goal 7 requires local governments to adopt natural hazard inventories, policies, and implementation measures into the comprehensive plan. Careful land-use planning can better prepare cities to deal with the damage that natural hazards can cause.

The Natural Hazards Chapter has two sections. The first part of the chapter is the inventory, which provides a definition of each hazard, a summary of risk, and additional information relevant to Madras for all eight of the natural hazards that Madras faces. The eight natural hazards are flood, winter storm, windstorm, earthquake, volcanic event, drought, wildfire, and landslide. The second part of the chapter lists several overarching, multi-hazard goals, followed by the goals, policies and implementation measures for each of the eight natural hazards. The goals, policies, and implementation measures identify opportunities to reduce the impacts of natural hazards on Madras.

## **Inventory**

Madras faces impacts from the following natural hazards: flood, winter storm, windstorm, earthquake, volcanic event, drought, wildfire and landslide. This inventory is organized by hazard. The subsections below (1) give a definition of each hazard, (2) summarize the risks each hazard poses to Madras, and (3) provide additional hazard information relevant to Madras.

This inventory is based, in part, on information contained in the *Jefferson County Natural Hazards Mitigation Plan* (Jefferson NHMP). Greater detail on Madras' susceptibility to hazard impacts (vulnerability), and the likelihood that the hazard will occur (probability) is available in the Jefferson NHMP. Volume II of the Jefferson NHMP and the Hazard Analysis and Risk Assessment section of the City of Madras Addendum to the Jefferson NHMP (Volume III) are incorporated herein by reference.

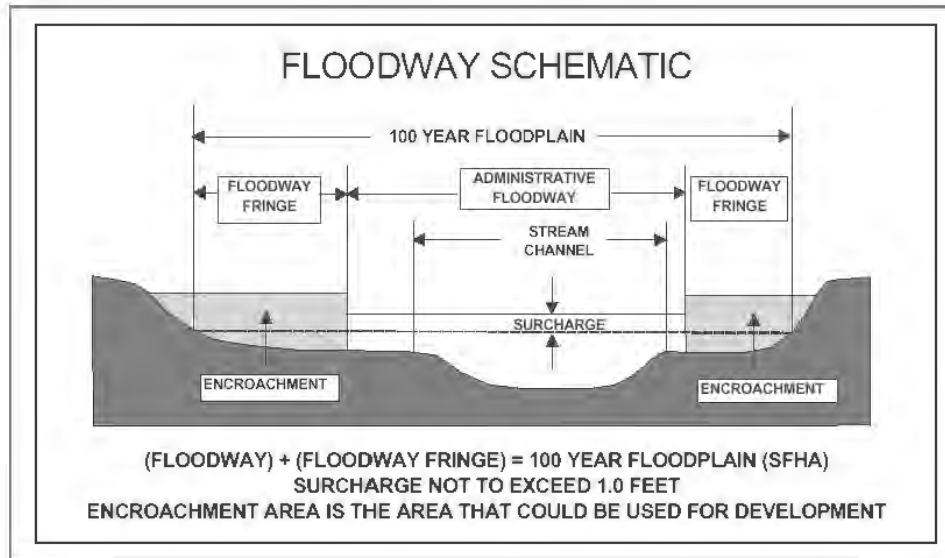
## **Flood**

Flooding results when rain or snowmelt causes the banks of rivers, streams, channels, ditches, and other watercourses to overflow. In Oregon, flooding is most common from October through April when storms from the Pacific Ocean bring intense rainfall. Flooding in Madras can become more intense when rain follows periods of snow and frozen ground; the spring cycle of melting snow is the most common source of flooding in the region. Cyclonic rainstorms that occur spring through fall also have produced floods in Madras (FEMA, July 17, 1989). The principal types of flooding that occur in the region are riverine, flash, shallow area, urban, and snowmelt floods. The primary source of flooding in Madras is Willow Creek.

Any property within the floodplain is considered at risk of flooding. The floodplain here refers to the mapped, regulatory area designated by the Federal Emergency Management Agency (FEMA), and is more precisely called the Special Flood Hazard Area (SFHA). FEMA recognizes that development in the SFHA, such as buildings and fill, has the potential to increase flood heights and flow velocities. FEMA addresses this potential by dividing the SFHA into a floodway and a flood fringe (see Figure 1). The floodway is the channel of the stream plus any adjacent area that must be kept free of development so that the 1% annual flood flows can be carried without substantial increase to the base flood elevation. The part of the SFHA not included in the floodway is the flood fringe. Development restrictions apply in the floodway once one is established.

FEMA's Flood Insurance Study for the City of Madras (1989) identifies floods for Willow Creek having 10 to 500 year return periods, corresponding to 10 to 0.02% probability of a flood happening in any given year. FEMA selected the 1% annual flood as the base flood for regulatory purposes. Some areas within the SFHA are more likely than others to flood, however, so considering the entire SFHA to be the 1% chance or 100-year floodplain can be misleading.

**Figure 1. Elements of the Special Flood Hazard Area (SFHA)**



Source: City of Raleigh, North Carolina

Currently, the City of Madras has development in both the floodway and the floodway fringe. The City of Madras has 211.7 acres in the SFHA. Of the 211.7 acres, 68.5 are designated as the floodway. The tables below show the amount of land by use and the number of structures in the floodway and the floodway fringe.

**Table 1: Land uses within the Special Flood Hazard Area by acreage and percentage**

	Floodway Acreage	Percentage of Floodway	Floodway Fringe Acreage	Percentage of Floodway Fringe
Commercial	7.972	12%	21.016	15%
Residential	8.071	12%	34.1	24%
Government	14.374	21%	19.685	14%
School	18.705	27%	27.885	19%
Utility	0	0%	0.272	0%
Vacant	19.375	28%	40.234	28%
<b>Total</b>	<b>68.497</b>	<b>100%</b>	<b>143.192</b>	<b>100%</b>

Source: Jefferson County Tax Assessor's Office

**Table 2: Number of structures within the Special Flood Hazard Area**

Structures in the Special Flood Hazard Area		
Floodway	88	26%
Floodway Fringe	254	74%
<b>Total</b>	<b>342</b>	<b>100%</b>

Source: Jefferson County Tax Assessor's Office

This information shows that more than 25% of all land within the floodplain and the floodway is vacant. The second highest land uses are school land within the floodway and residential land within the floodway fringe. These figures are derived from taxlot data, which means that the land uses not included in tax assessment, such as roads and infrastructure in the public right of way, are not included in this analysis.

Madras' vulnerability to flooding is high. A large portion of the City's critical facilities and infrastructure are located in the Willow Creek floodway. Critical facilities include the County Community Development Department, County Annex, County Courthouse, City Public Works buildings, County Library, Madras Elementary School, and Madras High School. Critical infrastructure includes the C Street Bridge, which crosses Willow Creek, and the B Street Bridge near the Public Works building.

## **Winter Storm**

Winter storms can consist of rain, freezing rain, ice, snow, sleet, hail, cold temperatures, and wind. These storms are most common from November through March. Winter storm events are relatively common in eastern Oregon. While snow, sleet, hail and ice can create hazards for motorists when it accumulates, freezing rain can cause the most dangerous conditions within a community. Ice buildup can bring down trees, communication towers, and wires, creating hazards for property owners, motorists, and pedestrians alike.

Winter storms create dangerous conditions for people traveling on the roadways. Heavy snowfall can reduce the visibility of road lanes and ice on the roads can make driving dangerous. Winter storms can hinder police, fire, and medical responses to urgent calls. When Highway 97 and Highway 26 are closed due to ice or other severe winter weather, Madras is isolated from other communities to the North and South. Additionally, winter storms can damage property and disrupt utilities. The City has limited capability to clear snow from city streets should heavy snowfall occur. The Madras area has experienced ten significant winter storms in the past decade, and is likely to experience more in the future.

## **Windstorm**

A windstorm is a storm with very strong wind, but little or no rain or snow. Windstorms occur during the winter and summer months, coming either with cold air or, in some cases, thunderstorms. On rare occasions, a windstorm can create a risk of a tornado in the area. Windstorms occur frequently in Madras.

Windstorms can result in collapsed or damaged buildings, damaged or blocked roads and bridges, damaged traffic signals, streetlights, and parks. Emergency response operations can be complicated when roads are blocked or when power supplies are interrupted. Windstorms can trigger flying debris, which can also damage utility lines; overhead power lines can be damaged even in relatively minor windstorm events.

Industry and commerce can suffer losses from interruptions in electric service and from extended road closures.

## **Earthquake**

An earthquake is a sudden and violent shaking of the ground as a result of movements within the earth's crust. Oregon is susceptible to three types of earthquakes: crustal, deep intraplate and subduction. The greater Jefferson County region has experienced minor crustal earthquakes over the past 20 years, few of which were felt and none of which produced damage. Primary earthquake related hazards include ground shaking, amplification, surface faulting, liquefaction, and earthquake-induced landslides. People, buildings, emergency services, hospitals, transportation lifelines, and utilities are susceptible to the effects of an earthquake.

Madras Elementary School, Madras High School, Westside Elementary School, and St. Charles Madras Hospital are critical facilities that have been identified as having a high, or very high collapse potential. Additionally, the City of Madras is susceptible to isolation given that Highways 97 and 26, and the Madras Municipal Airport, are the only major transportation routes connecting the city with the rest of the state.

While local crustal earthquakes have not produced damage, a historically less frequent Cascadia Subduction Zone earthquake may cause some damage within Madras. In the case of a Cascadia Subduction Zone earthquake, Madras may have a role in providing shelter and resources to refugees from coastal Oregon, and providing various other resources to support recovery based activities.

## **Volcanic Event**

A volcanic event can cause earthquakes, explosive release of gases and ash, and the extrusion or intrusion of magma. The Pacific Northwest lays within the "ring of fire", an area of very active volcanic activity surrounding the Pacific Basin. The Cascade Range has more than a dozen active volcanoes that have erupted at an average rate of 1-2 per century over the past 4,000 years.

This volcanic activity has shaped the entire region. Madras itself lies in a small valley in a broad flat plain, which lies between the Cascade Mountains on the west and the Ochoco Mountains on the east. This valley is rimmed on the west by the edge of a basaltic lava flow, sometimes called the "Rimrock Lavas". The city is underlain by the Madras formation, composed of stratified layers of sand, silt, ash, and pumice and contains some gravel lenses and interbed lava flows.

Volcanic events have the potential to coincide with numerous other hazards including ash fall, earthquakes, lava flows, pyroclastic flows, lahars and debris flows, and landslides. While a volcanic event may not have a direct lava flow impact on Madras, the ash fallout from an event in the Cascades could potentially affect the operation of Madras' facilities, as well as people suffering from respiratory problems.



## **Drought**

A drought occurs when a region experiences a period of drier than normal conditions resulting in water-related problems. Lack of rainfall can be a primary cause of drought. In predominantly agricultural communities, the impacts of drought can affect the overall economic stability of the area. Droughts also have environmental impacts, such as increased insect infestations and habitat loss for aquatic species.

Madras' vulnerability to drought is low, in part because the city has a dependable water source that is not affected by regional agricultural droughts. Though the probability of a drought is low in Madras, the probability of a drought in the greater Jefferson County area or the Deschutes River Watershed, is high. As a municipality using water from an aquifer in a potentially water-stressed area, Madras should recognize the possibility that the city could contribute to creating the conditions for a drought, even though residents may not experience any direct impacts of the lack of rainfall.

## **Wildfire**

A wildfire is an unplanned and destructive fire that can burn in forest, shrub, or grass if it is not controlled. Wildfires are common to Central and Eastern Oregon. Fire is an essential part of Oregon's ecosystem, but can also be a serious threat to life and property. Ignition of a wildfire may occur naturally from lightning, or from human causes such as debris burns, arson, careless smoking, recreational activities or from an industrial accident. Once started, fuel, topography, weather and development conditions affect fire behavior.

Madras is surrounded by agricultural fields, which are less likely to burn than sagebrush, grasslands, or forested areas. Fires that affect the city are usually human caused, and include house fires or brush burning, not wildfires.

## **Landslide**

A landslide occurs when a detached mass of soil, rock, or debris falls, slides or flows down a slope or a stream channel. Landslides are a common natural occurrence in Oregon, and are more likely to occur during heavy rainfall or earthquake events. In general, landslides tend to occur in areas that have experienced them in the past. Landslides are classified according to the rate of movement and the type of materials that are being dislodged.

The Department of Geology and Mineral Industries (DOGAMI) Statewide Landslide Information Database for Oregon (SLIDO) does not identify historic or mapped landslide data in Madras. However, the city does have steep slopes that could produce damage under the right conditions. More likely for Madras are impacts from a landslide occurring elsewhere in Jefferson County that could block road access along Highway 97, Highway 26, or SW Culver Highway. Road closures would affect commerce in Madras by delaying traffic, deliveries, and commuters.

## Goals, Policies and Implementation Measures

Statewide Planning Goal 7 is “to protect life and property from natural disasters and hazards.” The following goals, policies, and implementation measures provide specific ways that Madras can work towards achieving Goal 7. This section outlines goals, policies and implementation measures for overarching multi-hazard issues, and for each of the eight natural hazards that Madras faces.

### Multi-Hazard

#### **Goal 1. Reduce existing natural hazard risks within Madras through proactive mitigation and land use strategies.**

**Policy 1.1.** The City shall establish a program dedicated to local mitigation projects.

**Implementation 1.1.1.** Use local funds as leverage to match state and federal grant programs in order to identify and complete between one and three significant mitigation projects every three years. Projects identified in the Madras Addendum of the Natural Hazards Mitigation Plan shall have priority.

**Policy 1.2.** The City shall evaluate the need for zoning overlays to regulate land use in hazard-prone areas.

#### **Goal 2. Increase awareness about natural hazards in Madras, including actions the public can take to protect life and property from these hazards.**

**Policy 2.1.** The City shall develop an outreach and education program to make information on the risk of hazards and hazard mitigation more accessible to the public.

**Implementation 2.1.1.** Disseminate hazard mitigation information on a seasonal basis, through a variety of sources and locations, and in languages other than English, as needed.

**Policy 2.2.** The City shall develop a warning system to notify citizens of impending hazards and recommended safety precautions.

#### **Goal 3. Ensure City decisions related to natural hazards are based on the most current hazard information available in order to make informed decisions.**

**Policy 3.1.** The Community Development Department shall request an allocation of funds on an annual basis, as needed, to support the development or purchase of current hazard data.

**Implementation 3.1.1.** Coordinate and prioritize hazard inventories, policies, land use regulations, and maps in conjunction with the City's Addendum to the Jefferson County Natural Hazards Mitigation Plan to reflect new information, new laws and goal requirements, and changing circumstances in the community.

**Goal 4. Strategically position the City of Madras to support and potentially benefit from the State of Oregon's needs related to a regional, catastrophic natural disaster (e.g. Cascadia subduction zone earthquake and tsunami).**

**Policy 4.1.** The City shall proactively establish a plan to support state needs in the case of a catastrophic natural disaster in Oregon, in coordination with the Oregon Resilience Plan.

**Implementation 4.1.1.** Prepare Madras Municipal Airport to be a staging ground for regional disaster response.

**Policy 4.2.** The City shall pursue opportunities that will enable Madras to provide essential services in the event of a natural disaster in the region or state.

## Flood

**Goal 1. Direct new development to areas that are outside the Special Flood Hazard Area (SFHA) and ensure that any new development permitted in the SFHA is flood-ready.**

**Policy 1.1.** The City shall establish a greater than minimum base flood elevation (BFE) code for manufactured homes, residential development, and non-residential development.

**Policy 1.2.** The City shall prioritize the development of new public facilities outside of the SFHA.

**Policy 1.3.** The City shall consider creating incentives to remove existing development from the SFHA.

**Policy 1.4.** The City shall develop a plan to relocate public buildings currently in the floodway to land outside of the SFHA.

**Implementation 1.4.1.** The City and County building departments will work together to relocate the Public Works Building, County Community Development Department, County Annex, County Courthouse, County Library, Madras Elementary School, and Madras High School from the SFHA, as identified in the action items in the Madras Addendum of the Jefferson County Natural Hazards Mitigation Plan.

**Goal 2. Participate in FEMA’s Community Rating System (CRS) and achieve Class 6 or better by 2024 in order to reduce damage from flooding and lower flood insurance rates.**

**Policy 2.1.** The City shall participate in the CRS program.

**Implementation 2.1.1.** The CRS coordinator will apply for initial acceptance into the CRS by 2016, identify current flood mitigation initiatives, and monitor the completion of all future projects.

**Policy 2.2.** The City shall reduce flood damage to existing development through coordinated citywide management of information and infrastructure.

**Policy 2.3.** The City shall provide information and relevant links on the City website regarding the importance of purchasing flood insurance to protect property.

**Goal 3. Retrofit existing buildings in the SFHA in order to promote economic development.**

**Policy 3.1.** The City shall incentivize retrofits to buildings located in the SFHA through urban renewal, tax breaks or other measures to encourage flood-ready development.

**Implementation 3.1.1.** Develop a program to locate and elevate critical technology and equipment, including but not limited to HVAC and computer servers, to an increased base flood elevation level.

**Policy 3.2.** The City shall prioritize retrofits or relocation of existing critical facilities.

**Implementation 3.2.1.** Compile a list and rank retrofit projects in order of importance, and prioritize action items from the Madras Addendum of the Jefferson County Natural Hazards Mitigation Plan.

## **Winter Storm**

**Goal 1. Minimize road hazards and provide shelter during severe winter storms in order to preserve life and property.**

**Policy 1.1.** The City shall identify and prioritize the undergrounding of critical overhead utility lines throughout the city to protect them against ice formation.

**Policy 1.2.** The City shall educate residents about access to shelters during severe winter weather events.

**Implementation 1.2.1.** Advertise, promote and educate the community regarding emergency shelter provisions contained in *ORDINANCE NO. 837: Cold Weather Emergency* and *ORDINANCE NO. 831: Emergency Shelters*.

**Policy 1.3.** The City shall establish priority routes in coordination with the *Snow Removal Resolution* for the use of emergency services during winter storms.

**Policy 1.4.** The City shall monitor the quality of equipment and supplies for the removal of snow and ice annually.

**Goal 2. Reduce the likelihood of flood hazards caused by winter storms.**

**Policy 2.1.** The City shall not increase the likelihood of flooding as a result of snow clearing, removal and stockpiling.

**Implementation 2.1.1.** Update *Snow Removal Resolution* to include appropriate snow removal strategies and acceptable placement of snow banks, such as prohibiting the placement of snow banks along streams and creeks, particularly in locations upstream of the city.

**Windstorm**

**Goal 1. Minimize the impacts of power outages and road hazards caused by windstorms in order to preserve life and property.**

**Policy 1.1.** The City shall identify and prioritize the undergrounding of critical overhead utility lines throughout the city to protect them against strong winds.

**Policy 1.2.** The City shall implement a tree-trimming program that clears tree limbs hanging over high traffic streets and sidewalks.

**Implementation 1.2.1.** Update *ORDINANCE NO. 556: Right of Way* to set timeframes for biannual tree trimming program.

**Earthquake**

**Goal 1. Minimize the risk of damage to structures, utilities and critical facilities and infrastructure in the event of an earthquake in order to preserve life and property.**

**Policy 1.1.** The City shall educate residents on the State Building Code and voluntary measures that exceed the Building Code requirements to protect their properties.

**Implementation 1.1.1.** Provide educational materials or classes regarding earthquake safety and engineering solutions.

**Policy 1.2.** The City shall use education and serve as an example to promote voluntary construction techniques that exceed State Building Code requirements.

## **Volcanic Event**

**Goal 1. Limit the impacts of ash fall from a volcanic event on city operations and facilities.**

**Policy 1.1.** The City shall protect city-owned equipment, infrastructure and facilities from volcanic ash.

**Implementation 1.1.1.** Inform City departments of potential impacts to city equipment, infrastructure and facilities from volcanic ash.

**Goal 2. Educate the public about volcanic hazards and community evacuation plans in the event of volcanic activity.**

**Policy 2.1.** The City shall assist the Jefferson County School District to provide volcanic hazard education in public schools.

**Policy 2.2.** The City shall provide classes or educational material for the public on minimizing the impact of ash fall to their homes, vehicles and on their health.

## **Drought**

**Goal 1. Limit Madras' impact on local and regional potable water supplies.**

**Policy 1.1.** The City shall promote the use of water conservation strategies for all new construction.

**Implementation 1.1.1.** Develop and promote best management practices for xeriscape landscaping for residential and commercial development, and the installation of rainwater collection and distribution systems.

**Policy 1.2.** The City shall assess the impact of drought on emergency response times and minimize its impact on emergency fire response.

**Implementation 1.2.1.** Develop communication between Public Works and emergency response units to ensure that fire suppression infrastructure will work correctly in times of drought.

**Policy 1.3.** The City shall determine how new demands on the water system from population growth may impact occurrences of drought in Jefferson County and create an action plan mitigating the impacts, as needed.

## Wildfire

### **Goal 1. Minimize the risk of natural and human-made wildfires on life and property in Madras.**

**Policy 1.1.** The City shall continue to ensure emergency access to identified wildfire hazard areas.

**Implementation 1.1.1.** Identify and map wildfire hazard areas at the city level.

**Policy 1.2.** The City shall implement a community education program (such as Firewise) regarding fire dangers for identified risk areas.

**Policy 1.3.** The City shall continue to create environmentally appropriate density and defensible space requirements for structures located in wildfire hazard areas.

**Policy 1.4.** The City shall work cooperatively with the Jefferson County Fire District #1 to develop incentives for reducing fuels around development.

**Implementation 1.4.1.** Establish free brush and yard debris disposal days.

## Landslide

### **Goal 1. Minimize impacts of a regional landslide on transportation routes and development in order to maintain economic activity throughout the region.**

**Policy 1.1.** The City shall support the Department of Geology and Mineral Industries' efforts to identify areas of high landslide risk and vulnerability.

**Policy 1.2.** The City shall identify alternative transportation routes for major access ways that are susceptible to landslide in the city and the immediate surrounding area, and take measures to inform the public of alternative routes.

**Policy 1.3.** The City shall require geotechnical reports for new development located in high-risk landslide areas where excavation may be required to develop the site.

**Policy 1.4** The City shall require site review for development on slopes in excess of 10 percent.

**Implementation 1.3.1** Identify specific criteria for site review such as natural contours, drainage patterns, and vegetative features of the site.

[This section was revised by Ordinance No. 861 - Passed by Council on December 19, 2014]



**GOAL 8** - To satisfy the recreational needs of the citizens of the City and its visitors.

POLICIES - The City shall:

- A. Seek opportunities to develop the following recreational opportunities.
  - 1) Tennis Courts
  - 2) Handball and Racquet Courts
  - 3) Swimming Pool
  - 4) Bike Paths
  - 5) Publicly Owned 18-Hole Golf Course
  - 6) Hiking trails, public parks, play areas, and passive natural open spaces.

[5 and 6 added by Ordinance No. 781, Passed by Council on December 12, 2006]
- B. Improve and maintain a bike/hiking path along Willow Creek.
- C. Develop new neighborhood playground parks as the need occurs.

## Goal 9 - Economic Development

### *Vision Statement*

Madras, Oregon is a healthy community with a diverse economy that focuses on traded-sector (export) industries. The City strives to promote “family-wage” job growth and provide opportunities for economic development in a business-friendly environment. Madras supports the growth and expansion of existing businesses, especially businesses that provide jobs in core economic sectors, which include agricultural products and support services, manufacturing, aviation/aeronautics, trucking services and testing, and wood product manufacturing. Madras supports investment in community and higher education and training to ensure we have the skilled labor force needed to support our economy.

### *Goals*

1. Madras seeks opportunity for economic expansion in many economic sectors including new businesses that expand Madras Traded Sector economy, and that make use of existing economic development assets. Examples include but are not limited to:
  - Agricultural and Mining Industries (National)

- Aviation and Aerospace Development Services (National)
- Health Care and Community Services (Regional)
- Manufacturing – material handling, wood products, high tech (Regional/National/International)
- Tourism and Recreational Services (Regional)
- Transportation testing (National/International)
- Warehousing and Distribution Facilities (Regional)

2. Madras will take steps to facilitate economic growth and development by:

- a. Investing in basic transportation infrastructure that supports economic development, including roads, rail access, and aviation facilities.
- b. Ensuring the availability of public water and sanitary sewer service to land designated for employment uses.
- c. Supporting community investment in essential “high-speed” communication and information exchange infrastructure that supports education, commerce, and institutional land uses.
- d. Maintaining enough developable land to support economic development, including at the Madras Airport for air-side support services and business aviation.
- e. Pursuing the designation of a regional large-lot industrial site.
- f. Enacting programs that take advantage of the State of Oregon Enterprise Zone and other tax-incentive programs for new and existing businesses.

3. Madras is committed to balancing economic development goals with long-term preservation of the environment, including the area’s surface and ground water resources, air quality, and high-value farmland, which sustain the local economy.

### Policies

Madras will work to achieve these economic development goals using the following policies, which are numbered for reference purposes. All policies have equal standing and need to be balanced when applied to land-use planning decisions.

1. Provide an adequate supply of employment land in a variety of site sizes and locations, to meet employment growth forecasts.

2. Provide capacity and maintain the public infrastructure necessary to support local businesses and their employees, including roads, aviation and rail facilities, drinking water supply, and sanitary sewers.
3. Actively support investment in essential high-speed communications infrastructure to support the emerging information-economy, and seek ways to reduce communication tariffs on existing businesses and incubator sites.
4. Take steps to encourage investment downtown by adopting incentive programs that encourage redevelopment of property within the Willow Creek floodplain.
5. Encourage redevelopment of vacant and underutilized downtown commercial properties through fiscal policy, zoning regulations, and streamlined permitting.
6. Support businesses expansion and recruitment through local and regional economic development incentive programs.
7. Actively participate in regional economic development and recruitment efforts through Economic Development Central Oregon (EDCO).
8. Support planning and development of intermodal rail access through a rail siding and/or intermodal reload facility accessible to all employers in Jefferson County.
9. Promote economic development at the airport consistent with the Airport Master Plan.
10. Support workforce development and re-education efforts by the Jefferson County School District and the Madras campus of the Central Oregon Community College (COCC).

### Implementation Measures

Madras will take steps to achieve these economic development objectives using the following program and regulatory measures:

- a. Facilitate formation of an Ad Hoc economic development committee to identify and remove barriers to economic development in Madras and Jefferson County.
- b. Work with EDCO and local property owners to identify and designate a Regional Large-lot Industrial Development Site in or near Madras.
- c. Lead a rail access economic feasibility study that examines ways to improve inter-modal freight accessibility in Madras and Jefferson County, including facilities that support basalt mining and other commodity exports.
- d. Make public improvements in downtown and commercial corridors that reduce flood hazards and enhance development opportunities using urban renewal, ODOT highway enhancement, and local improvement financing tools.

- e. Pursue Oregon Enterprise Zone designations and other tax incentive programs for industrial development sites.
- f. Review the city's development application fees and look for ways to streamline development review with a "fast track" approval process for targeted reinvestment areas, including downtown Madras.
- g. Investigate regulatory and policy approaches to preserve the irrigated agricultural land base in the county that may be impacted by urban development.
- h. Work with Jefferson County and local property owners to expand the inventory of small to medium sized development parcels suitable for employment use.
- i. Review noise regulations and zoning in the vicinity of the Madras Airport to reduce future conflicts between uses.
- j. Review and update the Madras Enterprise Zone every other year to ensure consistency with state law.

[Goal 9 - Amended by Ordinance No. 889, passed by Council on June 14, 2016]

**GOAL 10** - To provide for the housing needs of the citizens of the City.

POLICIES - The City shall:

- A. Provide buildable land for a variety of housing types, affordable at all income-levels. ~~The City's existing housing inventory includes a generous supply of housing that is affordable for low and moderate income families at all income levels, such as multi-family and mobile housing units. The City's buildable land and development code provide for opportunities to development a wide range of housing types, from single-family housing, manufactured and prefabricated housing, middle housing types (such as duplexes, tri-plexes, quad-plexes, cottage housing, and townhouses), accessory dwelling units, and multi-family housing. So that a reasonable housing balance can be provided and that a mix of housing types on a variety of lot sizes are available for both existing and future area residents, the City shall encourage the development of housing types that are suitable for high income households. To be competitive with housing in the region that accommodates high income households, the encouraged housing type should include amenities appropriate for high income households, such as a golf course. Future housing should be consistent with the City's Livability Goals and Policies. With the addition of more housing targeted at high income buyers, the City will grow into a more diverse, vibrant, livable community.~~

[Paragraph A amended by Ordinance No. 781, Passed by Council on December 12, 2006]

- 1) The federal Department of Housing and Urban Development (HUD) have standard measures for income levels, based upon median family income (MFI). The income levels include, <30% of MFI is extremely low income; 30%-50% of MFI is very low income; 50%-80% MFI is low income; and 80%-120% is moderate income. HUD does not provide guidance on income levels beyond 120% of MFI. Based upon HUD's standards, the City concludes that >120% MFI is a high income household. The City has need for housing affordable at all of these income levels.

[Added by Ordinance No. 781, Passed by Council on December 12, 2006]

- B. Encourage development of suitable housing to satisfy all income levels. The City will focus on development of housing affordable for people who live and work in Madras. The City will:

1. Ensure that Madras' housing policies and ordinances allow for development of a range of housing types that meet the City's housing needs as described in the Madras Housing Capacity Analysis.
2. Develop, maintain, and grow partnerships to support needed housing development.
3. Support production of new housing and preservation of existing housing.

~~The City's existing housing includes a generous supply of housing that is affordable for low, and moderate income families, but there is a deficit of housing that is commensurate with the financial capabilities of existing and future high income families. The Department of Corrections Facility is expected to create high income jobs (i.e., jobs that will raise household incomes in excess of 120% of the MFI), and the City desires to attract these employees (and maintain existing high income families) as residents. So that housing is available for households at all income levels, rather than only low and moderate income households, the City shall encourage the development of housing that is suitable for high income households. To be competitive with housing in the region for high income buyers, the target housing in the City should include amenities appropriate for high income households, such as a golf course. With the addition of more livable and housing suitable for high income households, the City will grow into a more diverse, vibrant community.~~

[Paragraph B amended by Ordinance No. 781, Passed by Council on December 12, 2006]

IMPLEMENTATION MEASURE -

The City will continue to support the affirmative fair housing marketing plan as adopted by the City. ~~The City will also encourage the home-building industry to provide a variety of housing opportunities in sufficient quantities at affordable prices to meet the housing needs of existing and future residents. In order to provide the necessary variety of housing required by Statewide Planning Goal 10, the City's Goal 10 and related Policies, the City also establishes as a priority the provision of sufficient housing opportunities, with appropriate amenities, suitable for high income households. The City encourages this housing to be developed in accordance with the Master Planned Community Overlay zone, which requires generous open space and amenities, and encourages efficient use of land and public facilities and services, a variety of housing types, innovative designs and complete pedestrian-friendly communities.~~

[Paragraph amended by Ordinance No. 781, Passed by Council on December 12, 2006]

**GOAL 11** - To plan and develop a timely, orderly and efficient arrangement of public facilities and services to serve as a framework for urban and rural development.

POLICIES - The City shall:

- A. Continue to support the school district in providing adequate educational facilities.
- B. Provide urban services as required to the urbanizing areas of the City.
- C. Insure the provision of urban services--streets, water and sewer--as new developments occurs.
- D. The City shall continue coordinating the existing agreement between the City and Deschutes Valley Water District.
- E. The City shall coordinate with ODOT in implementing its improvement program.
- F. ~~The City shall continue to dispose wastewater treatment effluent at the Desert Peaks Golf Course. The City has secured additional publicly owned property for the land application of this treated effluent on the east side of Madras. This land is adjacent to both the~~

enlarged treatment and storage ponds which are either recently constructed or under construction at this time. The most efficient methodology for this form of effluent treatment is application on a golf course, which has a high evaporation rate. Therefore, the City encourages the development of the publicly owned land on the east side of Madras as a golf course that is suitable for irrigation with treated wastewater effluent.

[Subsection F, Added by Ordinance No. 781, Passed by Council on December 12, 2006]

- G. The City, with input from the DEQ, shall investigate the feasibility of an indirect discharge to Willow Creek at the SWWTP through constructed wetlands.

[Subsection G, added by Ordinance No. 918, Passed by Council on July 24, 2018.]

- H. The City shall investigate partnering opportunities and the economic feasibility to install an array of PV panels at either or both WWTP sites as a means for lowering power costs.

[Subsection H, added by Ordinance No. 918, Passed by Council on July 24, 2018.]

**GOAL 12** - To provide and encourage a safe, convenient, and economical transportation system.

**POLICIES** - The City shall maintain and improve the City's street network policies. The City shall undertake to resolve the following problems as noted in the inventories section of the Comprehensive Plan. These include:

- A. Construction of a bridge over Willow Creek to connect 10th Street. This will provide better access to and from a growing residential area to the North of the City.
- B. The intersection of northbound U.S. 97 and Adams Drive needs to be improved. The present "Y" situation creates a serious traffic hazard and can be easily corrected by turning Adams Drive sharply to form a 90 degree intersection.
- C. Buff Street needs to be extended to Grizzly Road to provide better East-West circulation.
- D. Although the following needs are out of the City's jurisdiction, the City urges and fully supports:



- 1) The placement of additional directional signs in the northbound lanes of 5th Street to announce the junction of Highways U.S. 26 and 97.
- 2) The short "U" turn at the South end of the one-way couplet is too short and creates a traffic hazard. The construction of a traffic island and slight relocation to the North of the East-West lanes would enhance the situation greatly.
- 3) The addition of a stoplight on one intersection of both North and South bound lanes of the one-way couplet would be of tremendous benefit by slowing through traffic and easing East-West traffic movement. A suggested location to be considered is 5th and "D" Streets and 4th and "D" Streets, when traffic reaches sufficient levels to meet state standards.

E. During the formulation of this plan, serious consideration was given to the establishment of a highway bypass around the City. It is the City's official position to oppose any relocation of the existing highway through the City at the present time.

**GOAL 13** - To conserve energy.

POLICIES - The City shall:

- A. Encourage more efficient use of utilities.
- B. Conserve energy in the cost of construction and operation of utilities.
- C. Encourage the development of alternative energy sources, including solar energy.

**GOAL 14** - To provide for an orderly and efficient transition from rural to urban land, and to provide for livable communities.

[Paragraph amended by Ordinance No. 781, Passed by Council on December 12, 2006]

POLICIES - A. The City, in cooperation with Jefferson County, shall establish an Urban Growth Boundary.

- B. The City, in cooperation with Jefferson County, shall mutually agree to a management plan for the Urban Growth Boundary area.
- C. The City, in cooperation with Jefferson County, shall establish an Urban Growth Boundary revision process to be utilized in a proposed change of the Urban Growth Boundary.
- D. The City shall encourage the development of complete, livable communities that include characteristics such as: a variety of lot sizes, dwelling unit types and ownership types, open spaces and other recreational amenities, a mix of land uses, school and community facilities, connected streets, proximity to downtown and other employment centers, and development that is scaled to the pedestrian and creates a sense of place. New growth areas should be developed in accordance with the Master Planned Community Overlay zone, which requires generous open space and amenities, and encourages efficient use of land and public facilities and services, a variety of housing types, innovative designs and complete pedestrian-friendly communities. Physical barriers, such as highways, tend to disrupt complete communities and livability because they disconnect areas from downtown and result in an auto-oriented environment of sprawl along highway corridors.

[Subsection D added by Ordinance No. 781, Passed by Council on December 12, 2006]

## **SECTION IV**

### **LAND USE ELEMENT**

The Land Use Element of the Comprehensive Plan is perhaps the most important portion of the Plan. This element allocates the uses of the land resources within the planning area and describes uses allowed within each designation. These are formal policy statements intended to assist in achieving the goals, objectives, and other policies of the Plan.

### **GENERAL DISCUSSION**

The City of Madras is responsible for planning the area inside the city limits. Planning designations for the area within the Urban Growth Boundary is a mutual and cooperative agreement between the City and Jefferson County. Jefferson County is responsible for planning and implementing their ordinance in areas outside the city limits. Specifically, for areas outside the city limits but inside the designated Urban Growth Boundary, the County is expected to administer the Plan as adopted by the City.

The Land Use element designates eleven basic land use categories and four overlay designations. The intent is to simplify administration and implementation of the Plan. The land use categories are:

R-1	<del>Single-Family Residential</del> <u>Moderate Density Residential</u>
R-2	<del>Multi-Family Residential</del> <u>Higher Density Residential</u>
R-3	Planned Residential Development
C-1	Corridor Commercial
C-2	Downtown Commercial
C-3	Community Commercial
NC	Neighborhood Commercial
MUE	Mixed Use Employment
I	Industrial
O/S	Open Space
A/D	Airport Development
MPC	Master Planned Community Overlay
FH	Floodplain Overlay
MO	Medical Overlay
AO	Airport Overlay

[The second paragraph and zoning designations were amended by Ordinance No. 770, Passed by Council on July 25, 2006 and by Ordinance No. 781, Passed by Council on December 12, 2006]

[Mixed Use Employment added by Ordinance No. 889, passed by Council on June 14, 2016]

## **BACKGROUND FOR LAND USE CATEGORY DECISIONS**

The City of Madras first implemented a zoning ordinance in 1947 and revised it in 1964, designating six land use zones including two commercial and two industrial. The concept of this Plan is to ease administration and implementation. The land use categories were derived by first reviewing the existing land use patterns of the City in the planning area and inventory of the buildable lands within the City. Then areas of special hazards such as floodplain and areas of natural resources, which the City desired to preserve and maintain were reviewed. Finally, the planning area residents discussed alternative future growth patterns.

The Land Use Plan Map was then developed by first designating the special hazard areas. The next step involved designating open space areas for parks and areas, which the City wishes to preserve. Commercial land use area was then considered and future needs for commercial activity were projected. It was noted that there is very little commercial land yet undeveloped within the existing city limits and therefore additional commercial lands were designated within the Urban Growth Boundary. Industrial lands surrounding the City were reviewed and it was noted the industrial park is inside the

Urban Growth Boundary with suitable lands available for significant development. The existing light industrial area within the City also allows for substantial development, therefore, no further industrial lands were designated. Existing residential uses were then reviewed and it was noted in reviewing the existing Land Use Map of the City that there are approximately 480 lots still vacant within the City. Therefore, there is room for substantial growth within the City as well as within the Urban Growth Boundary. The Plan designates ~~two~~ three residential categories-- R-1 "~~Single-Family Residential~~ Moderate Density Residential" and R-2 "~~Multi-Family Residential~~ Higher Density Residential", and R-3 "Planned Residential Development". ~~Minimum lot size requirements for R-1 "Single-Family Residential" shall be 7,500 square feet when the owner contemplates using both community water and sewer systems. Minimum lot size in the R-2 "Multi-Family Residential" zone shall be as outlined in the Zoning Ordinance.~~

After experiencing a period of rapid growth in the late 1990s and early 2000s, the City of Madras began to explore the possibility of expanding its Urban Growth Boundary (UGB) to accommodate planned growth. Expansion to the east is being considered based on the availability of public facilities (water, sewer collection and treatment, schools, recreation, roads) with sufficient capacity. At the same time, the City wanted to enhance the existing downtown and existing and emerging commercial areas, and to ensure that future development and redevelopment in those areas will contribute to a vibrant and successful commercial district. In order to help accomplish this goal, the Madras Redevelopment Commission (MRC) hired a land use consultant to assist in the preparation of a Comprehensive Plan and Zoning Ordinance Audit for Commercial Area within the Urban Renewal District (Audit).

[This paragraph added by Ordinance No. 770, Passed by Council on July 25, 2006]

The Audit focused on commercial areas within the Urban Renewal District. Working with the underlying premise that commercial development along the corridor should not detract from a vibrant downtown commercial district, the Audit recorded the fact that there were three distinct types of commercial areas each with unique characteristics. Completed in 2005, the final Audit recommendation included changes to the comprehensive plan, land use map, and zoning ordinance that define three distinct commercial districts; Corridor Commercial, Downtown Commercial, and Community Commercial.

[This paragraph added by Ordinance No. 770, Passed by Council on July 25, 2006]

- A. A general requirement for all residential land use categories is that any lot created after adoption of this Plan shall be served by a dedicated right-of-way. The Subdivision Ordinance shall establish minimum width and improvement standards of required rights-of-way. **In order to provide a correlation between the Comprehensive Plan Text and the Comprehensive Plan Map, the following information regarding the establishment of land use categories is provided.**

**[The last sentence added by Ordinance No. 781, Passed on December 12, 2006]**

1. **R-1 "~~Single-Family Residential~~Moderate Density Residential"**

~~Single-Family Residential~~The Moderate Density Residential (R-1) zone is intended to provide opportunities for a variety of residential housing types at the most common residential densities in places where sewer and water services are available. The R-1 zone is intended to provide for residential uses, with a mix of single-unit detached dwellings and other housing types at a scale compatible with single-unit dwellings. It also provides opportunities for supporting public and institutional uses on a case-by-case basis. The intended residential density of the R-1 Zone is 4 – 7.3 dwelling units per gross acre as calculated and further refined in the Development Code. ~~areas were designated in areas surrounding existing commercial and multi-family areas of the City. Primarily, these single-family residential lands are the outer edges of the city limits and into the Urban Growth Boundary. Minimum lot size for single-family residential shall be 7,500 square feet requirement. Modular home subdivisions utilizing dwelling units at least 20 feet wide, shall be allowed in the R-1 area. Duplexes shall also be allowed in the R-1 zone.~~

2. **R-2 "~~Multi-Family Residential~~Higher Density Residential"**

The ~~Multi-Family Residential~~Higher Density Residential (R-2) zone is intended to provide for a mix of housing types, with an emphasis on multi-unit residential and medium-scale attached housing types, and opportunities for limited neighborhood commercial uses. It also provides opportunities for supporting public and institutional uses on a case-by-case basis. It is suitable in areas where sewer and water service are available. It is most appropriate for areas in proximity to commercial areas and along or near major transportation and transit corridors.~~areas of the City were designated to serve as a buffer between commercial and single-family residential land uses. It is the intent to provide multi-family dwellings in close proximity of existing commercial use to provide for easier commuting to goods~~

~~and services for residents of these types of housing units. Neighborhood commercial facilities and mobile home parks shall be allowed after Planning Commission review. The Zoning Ordinance shall specify standards for lot size requirements for housing units locating within the boundaries of the R-2 area. The intended residential density of the R-2 Zone is 7 – 21.7 dwelling units per gross acre as calculated and further refined in the Development Code.~~

3. **R-3 “Planned Residential Development”**

Planned Residential Development land use areas, as designated on the Comprehensive Plan Map, are intended to recognize and enhance areas of scenic quality and view amenities by allowing for flexibility in project design while providing for essential development standards. Within these areas development, which is sensitive to the natural topography of the site, minimizes alterations to the land, and maintains, enhances significant natural resources and is compatible with the surrounding development is encouraged. The intended residential density of the R-3 Zone is 4 – 21.7 dwelling units per gross acre as calculated and further refined in the Development Code.

[Added by Ordinance No. 770, Passed by Council on July 25, 2006]

4. **C-1 " Corridor Commercial"**

Corridor Commercial land use areas as designated on the Comprehensive Plan Map are provided for the stability and growth of the City's economic base. The Plan provides for Corridor Commercial land to supplement the existing commercial activities

elsewhere in the City and to provide appropriate locations for auto-oriented uses. C-1 commercial lands are located to the North and South of the City's core commercial area, extending to the city limits. Within the Corridor Commercial areas, the City is committed to providing for auto-dependent and oriented uses while requiring reasonable development standards that will result in better urban design. Major commercial developments, shall be reviewed by the City for compatibility and consistency with the goals and objections of this Plan. No minimum lot size is established, however, all future commercial land uses shall conform to the standards set forth in the ~~Zoning Ordinance~~ Development Code, including site plan review.

[Amended by Ordinance No. 770, Passed by Council on July 25, 2006]

5. **C-2 “Downtown Commercial”**

The City has a strong commitment to foster a vibrant downtown. The C-2 Downtown Commercial designation is intended for commercial areas in and near the historic city center. New development in this district must be appropriate in scale and design to the existing downtown area. Private development and redevelopment and public improvements in the downtown district should enhance the pedestrian environment and provide a mix of uses and services. Uses that are predominantly auto-dependent do not support these goals and are, therefore, restricted in Downtown Commercial areas.

[Added by Ordinance No. 770, Passed by Council on July 25, 2006]

6. **C-3 “Community Commercial”**

This designation is suitable for areas that contain existing commercial businesses that are auto-oriented, but at a scale that is similar to businesses in the historic city center. Such areas include, but may not be limited to, the commercial area south of downtown. To recognize existing uses, areas designated as Community Commercial are intended to provide for a range of businesses and services that are consistent with the present urban scale of the area. The scale of future development should reflect the transition between downtown uses and Corridor Commercial. Auto-oriented uses are permitted in this district, but on smaller lots with limited parking.

[Added by Ordinance No. 770, Passed by Council on July 25, 2006]

7. **NC “Neighborhood Commercial”**

Neighborhood Commercial areas within a community provide logical locations for people to gather and create a local business center among residential areas. This provides for efficient use of land and urban services, encourages walking as an alternative to driving, provides more employment and housing options, and provides both formal and informal community gathering places.

8. **MUE “Mixed Use Employment”**



A zoning district that is intended to provide opportunities for the development of a variety of employment uses including business and office parks, light manufacturing / assembly, wholesale trade and show rooms, warehouse / distribution, retail goods and services, and other commercial and light industrial uses that are common in mixed-use employment districts.

[Mixed Use Employment added by Ordinance No. 889, passed by Council on June 14, 2016]

9. **I “Industrial”**

Industrial land is provided in an area of existing industrial use within the City limits of Madras and within the Madras Industrial Park. Future industrial development shall be reviewed by both the City and County to establish compatibility and consistency with the goals and objectives of this Plan.

[Amended by Ordinance No. 770, Passed by Council on July 25, 2006. Replaces the M-1 “Light Industrial “and M-2 “Heavy Industrial Zone Designations]

10. **O/S “Open Space”**

The Open Space/Public Facilities land use category is designed to show lands within the planning area that are established parks or lands that are under public ownership with established public uses taking place. This land use category may also allow communication facilities.

[Title Changed to Coincide With Paragraph two, General Discussion, Amended by Ordinance No. 770, Passed by Council on July 25, 2006]

[Sentence Added by Ordinance No. 913 Passed by Council on March 13, 2018.]

11. **A/D “Airport Development”**

Airport Development land use areas, as designated on the Comprehensive Plan Map, are intended to provide land adjacent to the airport facilities for future commercial and industrial uses, which may be dependent on air transportation.

[Added by Ordinance No. 770, Passed by Council on July 25, 2006]

12. **MPC “Master Planned Community” Overlay**

The purpose of the Master Planned Community Overlay is to foster the creation of complete communities with a range of land uses and housing types, permit the application of innovative designs, and to allow greater freedom in land development and flexibility in development standards than may be possible under the strict application of the applicable zoning provisions of this code. In permitting such design and development freedom, the intent is to encourage more efficient uses of land and public facilities and services, to address the community’s need for a variety of housing, commercial and recreational opportunities (particularly public recreational amenities) and to maintain the highest reasonable quality living environment. An approved Master Planned Community Development Plan guides future development of the subject site. All future land use approvals and development (i.e., subdivision approval) for the subject site shall be in accordance with the guidelines established in the approved Master Planned Community Development Plan.

[Added by Ordinance No. 781, Passed by Council on December 12, 2006]

13. **FH “Floodplain”**

The Willow Creek Floodplain, as established by the Federal Insurance Administration, is shown on the Comprehensive Plan Map as an overlay. The underlying land use categories shall control types of land uses that take place. The Floodplain designation is to

indicate the special construction techniques to be utilized in this area. The City's Floodplain Ordinance shall be consulted before specific building permits are issued for construction in the area.

[Title Changed to Coincide With Paragraph two, General Discussion, Amended by Ordinance No. 770, Passed by Council on July 25, 2006]

14. **MO “Medical Overlay”**

To provide for the growth and development of hospitals, clinics, or related health care facilities or complexes within a committed community service area. This overlay encourages the development of the facilities in a controlled development framework; provides for a variety of uses that may co-depend and/or support hospitals, clinics, or related health care facilities; protect such areas from encroachment of incompatible land uses that may have an adverse impact on the operation and future expansion of hospitals, clinics, or related health care facilities; and allows existing uses within the overlay boundary to remain conforming to the underlying zoning district.

15. **AO “Airport Overlay**

This overlay designation is intended to prevent the establishment of air space obstructions in airport approaches and surrounding areas through height restrictions and other land use controls as deemed essential to protect the health, safety and welfare of the people of the City of Madras and Jefferson County.

[Added by Ordinance No. 770, Passed by Council on July 25, 2006]

## **ESTABLISHMENT OF URBAN GROWTH BOUNDARY AND URBANIZATION**

One of the concepts of the Land Conservation and Development Commission's adopted goals and guidelines is the development of an Urban Growth Boundary. An Urban Growth Boundary is a line around the perimeters of the City, which is a boundary line for the future growth of City and to separate urbanizable land from rural lands. The Urban Growth Boundary must be mutually adopted by both the City and the Jefferson County. Once adopted, the Urban Growth Boundary is difficult to amend. Therefore, establishment of this boundary line was carefully considered.

Development of the Urban Growth Boundary for the City of Madras took approximately eighteen months to reach a tentative agreement between the two governing bodies. The boundary is shown on the Comprehensive Plan Map and contains approximately 1,400 acres of additional lands over and above the incorporated limits of the City of Madras.

## **URBAN GROWTH MANAGEMENT PLAN**

- A. Area inside the Urban Growth Boundary shall be zoned to meet City standards for single-family dwellings. Additional land use designations may also be indicated to be outside of the existing city limits. Jefferson County will utilize the

substantive portions of the City's ~~Zoning Ordinance~~ Development Code in the administration of this area.

- B. Within the Urban Growth area, the City shall retain jurisdiction for the land use decisions. Subdivision and partitioning developments will be required to meet the City's improvement standards as outlined in the City's Subdivision Ordinance.

[Amended by Ordinance No. 754, Passed by Council on March 14, 2006]

- C. City policy requires annexation in order to receive sanitary sewer service. Therefore, developments intending to utilize the minimum lot size standards will be required to locate in close proximity to the existing city limits to receive sewer service.
- D. Developments proposed away from sanitary sewer service will be required to meet region State Department of Environmental Quality standards for subsurface sewage disposal. Further, because sanitary sewer service may be anticipated in the future, proposed developments will be required to submit a redevelopment plan along with the preliminary plat, which provides for an orderly redevelopment of the subdivision in the event sewer service is provided. The development plan will allow a homeowner to reduce an oversized lot, which may not be economical once annexed to the City. Potential buyers must be notified of this option at the time of purchase.
- E. The City has determined, in the development of the plan, that the City may not be able to provide community water service to areas both inside and outside the existing city limits. Therefore, it is understood that within these areas, as of the date of adoption of this plan, the Deschutes Valley Water District may be requested to provide domestic water service to these urbanizing areas.
- F. The City shall be responsible for the preparation and adoption of the Public Facilities Plan.

## **AREAS OUTSIDE THE URBAN GROWTH BOUNDARY**

The City may enter into an agreement with the County that authorizes the City to have land use planning jurisdiction for areas outside of the Urban Growth Boundary. The purpose of such an agreement would be to provide flexibility to approve large, long range development projects, such as a Master Planned Community, even if portions of the property are outside of the UGB at the time of approval. Any such agreement, and approvals there under, would expressly state that no level of urban development or services could be developed until the property was included in the UGB, annexed to the City and zoned for urban development.

[Amended by Ordinance No. 781, Passed by Council on December 12, 2006]

## **ADMINISTRATIVE PROCEDURES**

This Comprehensive Plan shall be reviewed by the Planning Commission every two years in order to provide a working document that is kept up to date as conditions and needs change in the community. When such changes are required, the following processes are established for that purpose.

## **REVISIONS**

There are two types of revision processes for the Comprehensive Plan. The Plan may be changed by either (1) legislative or (2) quasi-judicial action. Types of revision and processes are outlined below. In determining which process to follow, the City's administrative staff shall review the application and recommend the proper course of action. The administrative decision may be appealed to the Planning Commission.

## **MAJOR REVISIONS (LEGISLATIVE)**

A major revision to this Plan is defined as a policy making change in the text or plan map that will have widespread and significant impact through the planning area. The proposed change will be considered as a legislative action and will require the following procedure:

- A. The City Council or Planning Commission may initiate the proposed change.
- B. The adopted citizen and agency involvement programs shall be utilized to stimulate the public interest and participation in the amendment process.
- C. A public hearing shall be conducted by the Planning Commission.
- D. At least 21 days notice to the public of the hearing shall be published in a local newspaper of general circulation.
- E. In order to submit a favorable recommendation for the proposed change to the City Council, the Planning Commission shall establish the compelling reasons and make a finding of fact for the proposed change. These include:
  1. The proposed change will be in conformance with statewide planning goals.
  2. There is a demonstrated need for the proposed change.

- F. The City Council, upon receipt of the Planning Commission recommendation, may adopt, reject, or modify the recommendations or may conduct a second public hearing on the proposed change.
- G. In all proposed amendment actions, the City Council must make the final decision to adopt or deny the proposed change.

### **QUASI-JUDICIAL REVISIONS**

A quasi-judicial revision is defined as an amendment to the Comprehensive Plan Map, which consists of an application of the policies of the Plan to a particular piece of property with no widespread significance and having no general applicability to areas of similar use.

- A. Private individuals, property owners, or governmental agencies may initiate the proposed change. Cost for notification and advertising shall be borne by the applicant.
- B. The adopted citizen and agency involvement programs shall be utilized to stimulate the public interest and participation in the amendment process.
- C. A public hearing shall be conducted by the Planning Commission.
- D. At least 21 days notice to the public of the public hearing shall be provided. The notice shall be published in a local newspaper of general circulation.
- E. Individual notices shall be mailed to property owners within 250 feet of the area subject to the proposed change. These notices shall be mailed at least 21 days prior to the scheduled public hearing.
- F. In order to submit a favorable recommendation for the proposed change to the City Council, the Planning Commission shall establish the compelling reasons and make the following finding of fact for the proposed change:
  - 1. The proposed change will be in conformance with the statewide planning goals.
  - 2. There is a demonstrated public need for the proposed change.
- G. The City Council, upon receipt of the Planning Commission recommendations, may adopt, reject, or modify the recommendation or may conduct a second public hearing on the proposed change.
- H. In all proposed amendment actions, the City Council must make the final decision to adopt or deny the proposed action.

## **URBAN GROWTH BOUNDARY REVISIONS**

The Urban Growth Boundary as shown on the Comprehensive Plan Map has been mutually agreed upon and adopted by both the City of Madras and Jefferson County. From time to time, it may be necessary to amend the Urban Growth Boundary. Because two separate jurisdictions are involved, the Urban Growth Boundary amendment process can be quite complicated. In order to provide the most direct approach and hopefully simplify the process, the following steps shall be taken:

- A. The proposed amendment to the Urban Growth Boundary may be initiated by the City of Madras or Jefferson County, or other governmental agencies or private individuals. Cost for notification and advertising shall be borne by the applicant.
- B. The Madras City Planning Commission shall conduct a public hearing concerning the proposed boundary amendment. Notice of public hearing requirements shall be the same as those outlined in the quasi-judicial process of the Comprehensive Plan.
- C. Citizen and Agency Involvement Programs shall be utilized to stimulate public interest and participation in the amendment process.
- D. In order to make a favorable recommendation on the boundary revision, the Planning Commission shall make its recommendation based upon the consideration of the following factors:
  1. Demonstrated need to accommodate long-range urban population growth requirements consistent with Statewide Planning Goals.
  2. Need for housing, employment opportunities, and livability.
  3. Orderly and economic provision for the public facilities and services.
  4. Maximum efficiency of land uses within and on the fringe of the existing urban area.
  5. Environmental, energy, economic, and social consequences.
  6. Retention of agricultural land as defined, with Class I being the highest priority for retention and Class VI the lowest priority.
  7. Compatibility of the proposed urban uses with nearby agricultural activities.



- E. The City of Madras Planning Commission recommendations and findings shall be forwarded to the Jefferson County Planning Commission for review and consideration. The Jefferson County Planning Commission may adopt, reject, or modify the recommendation, or may conduct a second public hearing (procedural requirements of which will be in conformance with the adopted hearing process of Jefferson County) to consider the proposed amendment.
- F. The two Planning Commission recommendations and findings shall then be transmitted to the Madras City Council for review and consideration. The City Council may adopt, reject, or modify the recommendations of the Planning Commission, or may conduct another public hearing to receive public input on the proposed amendment.
- G. The City Council upon acting on the proposed amendment to the Urban Growth Boundary, shall then forward its findings to the Jefferson County Board of Commissioners for review and consideration. The Jefferson County Board of Commissioners must conduct a public hearing on the proposed amendment. If, for any reason, the County Board of Commissioners in its findings should determine the boundary line as adopted by the Madras City Council is in appropriate, such findings shall be returned to the Madras City Council for review prior to the formal adoption by the County.
- H. A joint work session of the two governing bodies may be required to develop mutual understanding of the issues involved.
- I. In the event the matter cannot be mutually agreed upon, the Land Conservation and Development Commission may be requested to assist in resolving the matter.

## **CITY OF MADRAS**

### **PUBLIC FACILITIES PLAN**

**Adopted May 27, 2003**

**Amended by Ordinance No. 754, March 14, 2006**

**Amended by Ordinance No. 918, July 24, 2018**

## **PURPOSE STATEMENT**

Oregon Administrative Rules (OAR) 660-011-0010 through OAR 660-011-0045 require cities and counties in Oregon to develop and maintain Public Facilities Plans to help assure that urban development within their boundaries is guided and supported by types and levels of urban facilities and services appropriate for the needs and requirements of the community, and that facilities and services are provided in a timely, orderly and efficient arrangement. Public Facilities Plans also are intended to serve as a framework for urban and rural development within a city's urban growth boundary (UGB).

The Madras Public Facility Plan (PFP) is intended to further the purposes of Statewide Planning Goal #11. The PFP includes the following information:

- Goals and policies for incorporation in the City’s Comprehensive Plan to guide planning, constructing and financing public facilities.
- Narrative descriptions of existing and planned water, wastewater, storm drainage, and transportation facilities.
- Capital improvement plan for future construction of facilities. The plan contains information about facility costs, schedule and funding sources.
- General financing plan indicating how the City plans to finance current and planned facilities and services.

The City of Madras has an urban growth management agreement with Jefferson County and is party to a coordination and urban services agreement with Deschutes Valley Water District specifying procedures for coordinating land use planning and provision of services. These agreements state that the City and Jefferson County will cooperate and coordinate in producing a public facilities plan. The agreement with the Deschutes Valley Water District states that the City and the District will cooperate in planning for services that affect urban property. The County is coordinating and cooperating in preparation of this plan by reviewing and commenting on draft documents and are expected to provide statements that they have done so prior to adoption of the PFP by the City. The following policies also address coordination issues.

This plan will be updated in the future to reflect needed updates caused by proposals for new development, within or outside the City. A plan policy states that the PFP will be updated periodically, as needed.

## I. GOALS AND POLICIES

The following table includes policies recommended for inclusion in the City’s Comprehensive Plan. They are organized by general topic. These policies are intended to be consistent with state law and existing City policies and practices, for promoting efficient and effective provision of urban services and protecting natural resources. The specific rationale for each policy is described in the table.

OAR 660-011-0010 (1) (e)

### A. General issues regarding provision of urban services and how these should be coordinated with urban growth management strategies.

#### **Policies:**

1. The City shall assure urban services (water, sewer and storm drainage services and transportation infrastructure) to residential, commercial and

industrial lands within the City's Urban Growth Area as these lands are urbanized.

Rationale: *Identifies the City's responsibility to provide urban services to developed lands in the City. [UGAMA]*

(Amended by Ordinance No. 754, Passed by Council on March 14, 2006)

2. To minimize the cost of providing public services and infrastructure, the City shall discourage inefficient development without adequate public services and promote efficient use of urban and urbanizable land within the City's urban growth boundary, including requiring all urban development to be served by full urban services.

Rationale: *Protects against inefficient urban growth and also helps the City meet the intent of Goal 14. [UGAMA]*

(Amended by Ordinance No. 754, Passed by Council on March 14, 2006)

3. The City shall support development that is compatible with the City's ability to provide adequate public facilities and services.

Rationale: *Allows the City to keep growth from outpacing the City's ability to service the new development. [UGAMA]*

(Amended by Ordinance No. 754, Passed by Council on March 14, 2006)

4. The City shall prioritize development of land serviced by utilities and require the extension of water, sewer, and storm drainage facilities for all urban level development within the UGB.

Rationale: *Promotes efficient urban growth and reduces the cost of providing services. [UGAMA]*

(Amended by Ordinance No. 754, Passed by Council on March 14, 2006)

5. The City shall coordinate provision of public services with annexation of land outside the City limits.

Rationale: *Helps coordinate annexation and public service policies. [UGAMA]*

(Amended by Ordinance No. 754, Passed by Council on March 14, 2006)

6. The City shall adopt long-range master plans for its water, sewer, storm drainage, and transportation systems and review and/or update them periodically.

Rationale: *Regular review of master plans is important in identifying new infrastructure needs and ensuring adequate provision of urban services concurrent with growth.*

**B. Policies related to water, sewer, storm drainage and transportation infrastructure and their maintenance and financing.**

**Policies:**

7. The City shall adopt and periodically update, as a supporting document to this Plan, a Public Facilities Plan, for development of public services and facilities in conformance with the policies of the Comprehensive Plan. Significant changes in projected capacity of public facilities required by proposed new development to be served by the City may necessitate update of the Public Facilities Plan.

Rationale: *Links the Comprehensive Plan with the Public Facilities Plan, pursuant to state law.*

8. The City shall comply with state and federal regulations for utility systems.

Rationale: *Ensures the City complies with all applicable laws.*

9. The City shall establish and maintain a range of funding mechanisms for building new water, sewer, storm drainage and transportation infrastructure and maintaining existing infrastructure.

Rationale: *Helps ensure that there are adequate funds to maintain infrastructure and pay for new extensions.*

10. The City shall monitor the condition of water, sewer, storm drainage and transportation infrastructure and finance regular maintenance of these facilities.

Rationale: *Helps ensure that infrastructure is monitored and maintained.*

11. The City shall utilize its adopted Systems Development Charges (SDCs) to finance new water and wastewater infrastructure as allowed by state law, and adjust SDCs to keep them up-to-date with current costs.

Rationale: *Formalizes use of adopted SDCs for expansion and maintenance of infrastructure (wastewater, domestic water, storm water drainage and transportation).*

12. The City shall establish and maintain utility rates and user fees that equitably allocate costs for operations and maintenance to users.

Rationale: *Establishes means of paying for utility infrastructure that is fair and efficient.*

13. The City shall maintain a supply of commercial and industrial land that is serviceable by water, sewer, storm drainage and transportation infrastructure.

Rationale: *Implements Goal 9, Economic Development, requirements.*

14. The City shall periodically amend its Comprehensive Plan (public facility projects) as implementing plans and agreements are updated.

Rationale: *Implements rule requirements to amend the project list to include significant modifications and helps ensure the project list remains current.*

### **C. Policies related to water and storm drainage systems.**

#### **Policies:**

15. The City shall protect its domestic water supply by:
  - Coordinating with Deschutes Valley Water District (provider of domestic water within the city limits of Madras)
  - working with landowners and managers for protection of water sources and adhering to applicable permitting requirements when approving new residential, commercial and industrial development and when constructing new water, sewer, storm drainage transportation infrastructure

Rationale: *Protecting the City's water supply is a key component to ensuring adequate water quality and quantity for residents.*

16. The City shall within the next five (5) years plan for and adopt standards for stormwater drainage detention and management facilities for management of urban storm runoff as an environmental service, rather than flood control during periods of heavy rain. In doing so, where feasible, the City will encourage natural storm drainage management techniques, such as landscaping, retention ponds and natural drainage ways.

*Rationale: New methods of stormwater drainage management that emphasize natural processes are more cost-effective in the long-term and prevent other water quality and flooding problems.*

17. The City shall take steps to minimize adverse impacts from construction and other sources of erosion and sedimentation on natural drainage ways and storm drainage facilities.

*Rationale: Natural drainage ways are a crucial part of a City's overall storm drainage management infrastructure and long-term ecological health.*

#### **D. Design Standards.**

##### **Policies:**

18. In order to allow for safe, orderly and coordinated development, the City shall adopt utility and transportation design standards and construction specifications as part of its development Code.

*Rationale: Provides a link between the Comprehensive Plan, Transportation System Plan, and the City's Development Code.*

The City is required by Statewide Planning Goal #11 (Public Facilities) and the Oregon Administrative Rule 660-011 (Public Facilities) to prepare, or update the public facilities plan and support for the Comprehensive Plan amendment.

The following findings support adoption of the Public Facilities Plan and the Comprehensive Plan amendment for the City of Madras. The City is coordinating with Jefferson County in this effort to provide a "Public Facilities Plan", where it relates to property within the Urban Growth Boundary.

## **II. OAR 660-011: PUBLIC FACILITIES**

OAR 660-011-005(9) In accordance with OAR 660-03-0010(2)(c) and urban growth management agreement.....



- The City complies with OAR 660-011-005(9) regarding the Urban Growth Area Management Agreement (UGAMA) requirements [OAR 660-03-0010(2)(c)]. An UGAMA was approved and adopted by the City of Madras and Jefferson County on June 12, 2002.

OAR 660-011-0010 The public facilities plan must include inventory and condition assessment; project list and descriptions; estimated project costs; project locations or map; policy statements or UGAMA; project timing; financial plan.

- The revised public facilities plan updates the description and condition assessment of the domestic water, sanitary sewer, stormwater drainage and transportation system.

It contains lists of capital improvement projects for the systems that include project descriptions, cost estimates, location and timing.

OAR 660-011-0010(1)(e)

The City has in place an approved and adopted UGAMA with Jefferson County; and a cooperative and urban services agreement with Deschutes Valley Water District, who is the domestic water provider for the portions of the city and for areas within the Urban Growth Boundary.

OAR 660-011-0010(g)

A proposed financing plan for the extension and improvement of these systems is part of the revised sections of the comprehensive plan.

OAR 660-011-0015(1)(2)(3) Responsibility for plan preparation, adoption and amendment of the Public Facilities Plan must be specified in the UGAMA.

- The UGAMA states on page 10, #M, that the City of Madras shall be responsible for Public Facility Plans for facilities. The City shall coordinate with the county to include these plans in the public facilities plan for the Urban Growth Boundary.

The Deschutes Valley Water District and the City have an approved and adopted coordination and urban services agreement (August 13, 2002), which states the city and Deschutes Valley Water District will prepare and implement a master plan for water service within the Urban Growth Boundary. The mater plan will be incorporated into the City's public facilities plan that is an element of the City's Comprehensive Plan.

OAR 660-011-0020 Inventory and Determination of Future Facility Projects

1. The Public Facility Plan must include an inventory of significant public facility systems, or reference the Comprehensive Plan, background document or other plan.
  - The Public Facility Plan references the December, 2000 Water System Master Plan that describes existing facilities, long term needs, supply sources and future projects.
  - The Public Facility Plan describes the main components of the City's wastewater collection, conveyance and treatment system. The most recent revision of the "Wastewater System Master Plan" was completed in [July 24, 2018](#). The Master Plan reviews the existing operation and the future needs and lists alternatives for expansion and improving the wastewater system.
  - The Public Facility Plan acknowledges the attempt to evaluate the City's existing storm drainage system. The storm drainage capital improvement plan was prepared in October 1991. The plan is intended to be a basic framework for planning and establishing guidelines for future guidelines. SDCs were developed for the City with this document.
  - The Public Facility Plan references the 1998 Transportation System Plan that forecasts future travel demand and recommends transportation improvements. The Transportation System Plan was prepared to meet OAR 660-012-000.
  
2. Public Facility Plan must identify significant public facility projects by type, service area and capacity.
  - The Public Facility Plan contains a list of water, sanitary sewer and transportation system projects and categorizes them by type. It evaluates the capacity of the systems, which will depend on the population projections for the City and makes recommendations for improvements to address insufficient capacity or other needs.
  - The Public Facility Plan notes that the city does not have a comprehensive storm drainage system. It does list the improvements that are slated to occur in the future and it does provide the mechanism for SDCs.
  - Potential future modifications are expected through the regular cycle of master plan updates. The Public Facility Plan identifies needed changes to existing facilities. Proposed Comprehensive Plan Policy #7, states the Public Facility Plan will be updated periodically as needed. It further states, that significant development or planning proposals may necessitate an update.

OAR 660-011-0025 Timing of required Public Facility. The Public Facility Plan must include a general estimate of the timing for planned public facilities and identify approximate year for development.

- The Public Facility Plan assigns all water, sanitary sewer and transportation system improvement projects to be either short-term (0-5 years), or to be driven by the City's population projections for the next 20 years.

OAR 660-011-0030 Location of Public Facility projects. The Public Facility Plan must identify the general location of the public facility project with a specification appropriate for the facility.

- The Public Facility Plan identifies the location of water, sanitary sewer, storm drain and transportation system improvements and other projects. A map is included in the Public Facility Plan showing project locations; or a list is provided showing the improvement location and what the improvements are, or will be.
- Proposed Comprehensive Plan states that the Public Facility Plan will be updated during the City's periodic review, or as necessary for development. This update is during the City's periodic review, which is Task #3 of its Work Program.

OAR 660-011-0035 Cost Estimates and financing. The Public Facility Plan must include rough cost estimates for water system projects identified in the facility plan and discuss existing and alternative funding mechanisms.

- The Public Facility Plan estimates the rough costs for each of the systems improvements. The Public Facility Plan also discusses the funding sources for the improvements and expansions.
- The Public Facility Plan also notes that the City can require developers to provide on-site drainage systems to new developments, and the in-place SDCs, which are for improving and expanding facility systems.
- The Public Facility Plan estimates the cost for each of the transportation system improvement projects. It discusses funding sources for long-term system improvement needs.

OAR 660-011-0040 Plan Submittal. The Public Facility Plan must be completed, adopted, and submitted by the time of the responsible jurisdiction's periodic review.

- This Public Facility Plan is scheduled for review and recommending adoption to the City Council by the City of Madras Planning Commission on May 7, 2003. The City Council is scheduled for its public hearing on May 27, 2003.

OAR 660-011-045 Plan adoption. The Public Facility Plan must be adopted by the responsible jurisdiction as a supporting document to the Comprehensive Plan. The Public Facility Plan must anticipate changes to planned projects and allow for amendments.

- The City of Madras is the responsible jurisdiction for adopting the revised Public Facility Plan to reflect amended Public Facility Master Plans. The “Master Plans” provided information and assistance in the revision of this Public Facility Plan and is adopted into the City’s Comprehensive Plan by reference.
- Implementation - The City shall implement the various elements of this Public Facility Plan through implementation on its master plans for specific facilities and the UGAMA agreements.

### **III. STATEWIDE PLANNING GOAL #11**

**Guideline #1** - Coordination of plans for Public Facilities and services with plans for designation of urban boundaries and urbanizable lands.

- City’s Comprehensive Plan states that the City will ensure provision of services for designation of urban boundaries and urbanizable lands.
- City’s Comprehensive Plan states that the city will ensure provision of services to areas as they are urbanized and coordinate provision of services for land outside the city limits with annexation policies.

**Guideline #2-** Public Facility for rural areas should not support urban areas.

- The City will ensure provision of services to lands as they are urbanized; the City of Madras does not manage any rural facilities.

**Guideline #3-** Provide public facilities at levels that support urban uses.

- The City will ensure provision of services to areas as they are urbanized and discourage inefficient development patterns.

**Guideline #4-** Public Facility and services in urbanizable areas.

- The City will ensure provisions of services to areas as they are urbanized; discourage inefficient development patterns; prioritize for developed land already served by Public Facility; and coordinate provision of services for land outside the city limits with annexation procedures.

**Guideline #5-** Coordination of development in urbanizable area between urban service providers.

- The City of Madras has an adopted UGAMA with Jefferson County and a “Coordination and Urban Services Agreement” with Deschutes Valley Water District. These agreements specify that the City will coordinate with these entities in planning for and providing services in the UGB.

**Guideline #6-** Location of utility lines and facilities only on existing public or private Right-of-way.

- All utility lines and facilities are on existing Right-of-ways and do not divide existing farm units.

**Guideline #7-** Consideration of carrying capacity of air, water and land.

- The various elements of the Public Facilities Plan identified needed improvements and changes to water, sanitary sewer, and storm water systems to protect water quality and quantity. The transportation element identified improvements to reduce travel demand and improve air quality.

## **B. Implementation**

**Guideline #1-** Programming and budgeting capital improvements.

- The Public Facility Plan includes a list of major capital improvements to ensure adequate water, sanitary sewer and transportation facilities needed for the City’s urban and urbanizable areas. The Public Facility Plan notes the estimated cost of the projects and discusses existing and alternative funding mechanisms.

**Guideline #2-** Public Facility support sufficient land to maintain adequate housing market.

- Public Facility identifies the major improvements to the water, sanitary sewer, storm drainage and transportation facilities needed to support the project population growth for the city.

**Guideline #3-** Consider level of facilities that can be provided when planning urban uses.

- The City's Comprehensive Plan provides for development based on availability of services.

**Guideline #4-** Designate sites of power generation facilities.

- The City of Madras has adequate power generation facilities to serve the needs of the community.

**Guideline #5-** Additional methods to achieve desired types and levels of Public Facilities.

- The financing plan portion of the Public Facilities Plan identifies a variety of funding methods for future facilities, includes SDCs, grants, and developer responsibility for service facilities.

**Guideline #6-** Define implementation roles.

- The Public Facility Plan identifies the management systems for water, sanitary sewer, storm water drainage and transportation.

## IV. PUBLIC FACILITIES DESCRIPTIONS

### A. Domestic Water System

- OAR 660-011-0010(1)(a)

The City of Madras obtains its domestic water from three (3) wells and from the Deschutes Valley Water District. The first well was drilled in 1912, with static water level in the well is 330 feet below the surface and drawdown is to approximately 380 feet when pumping at a rate of 150 gpm. The second well was drilled in 1966 to a depth of 450 feet, produces 400 gpm. The static water level is 330 feet and a 40 foot drawdown. The third well was drilled in 1972 to a depth of 477 feet, produces 300 gpm.

The Deschutes Valley Water District provides water to approximately 850 services. As the city's urban growth boundary and city limits continues to expand, the District will be providing domestic water to more services within the city limits of Madras.

The District takes its water from Opal Springs, along with three wells, which were drilled in 1997.

The “Water System Master Plan” for Deschutes Valley Water District was prepared in December 2000 by Robert MacRostie, Manager and Edson Pugh, Assistant Manager/Engineer.

The master plan identifies the existing facilities, long-term needs, supply sources and the future projects for the water system. The City of Madras is currently in the process of utilizing this and other information to update its Water System Master Plan. The City has already identified the need for upgrades to its existing system.

Deschutes Valley Water District’s Master Plan has outlined future needs to the year 2016. These projects range from putting in a 24” transmission main to a 3,000,000 gallon reservoir at Round Butte.

Currently, there is no infiltration or treatment of Opal Springs of any kind, nor is any needed. The only chlorination being done is on a very limited basis to the District’s reservoirs. The District’s distribution system north of the Metolius Reservoirs has a very low chlorine residual ranging from 0.01 ppm to 0.03 ppm. This is a preventative amount of chlorine that is designed to keep coliforms from building up in the system.

- OAR 660-011-0010(1) (b), (c), (d), (f)

**Table 1. FUTURE PROJECTS**

24” Transmission main
3,000,000 gallon Reservoir
2,000,000 gallon Reservoir
16” mainline
3,000,000 gallon Reservoir
24” discharge mainline

Information taken from the Deschutes Valley Water District Master Plan, December 2000.

Table 2. Projects Timing, which follows, list the projects and the timing in which they will be constructed.

**Table 2. PROJECTS TIMING**

--	--



TIMING	PROJECT
0-5 years	24" Transmission main, and preparation
	3,000,000 gallon Reservoir at Round Butte, along with site preparation, and foundation
	2,000,000 gallon Reservoir at Metolius site, along with site preparation
	400 feet of 2" Galvanized - Plum Street
	4,300 feet of 6" PVC - Lee Street to Jefferson Street; Lee Street along Highway 26 to Hoffy's and Juniper Motel
6-20 years	16" mainline from Metolius Reservoirs
	3,000,000 gallon Reservoir at the main Reservoir Site
	24" Discharge mainline from Opal Springs

## B. Wastewater System

- OAR 660-011-0010(1) (a), (b), (d), (f)

### S.1 INTRODUCTION

**General.** The Wastewater Master Plan (WWMP) Update addresses the City's service needs for a 20-year planning period and presents recommendations for meeting those needs. The City had a comprehensive WWMP prepared in 1996 that provided an analysis of the City's wastewater (WW) facilities and many of the recommendations from that original study have been implemented. This update builds on the results of the 1996 study to the extent they still apply. Planning Area. This study addresses needs for the area inside the City's Urban Growth Boundary (UGB), with a few exceptions. The City serves two customers outside the UGB: the State's Deer Ridge Correctional Institution (DRC) and the Madras Municipal Airport. Also, the WW treatment, effluent storage and effluent recycling facilities addressed in this study extend beyond the UGB.

**Regulations for Wastewater Facilities.** The City operates the WW facilities according to a Water Pollution Control Facility permit and the governing rules issued by the State Department of Environmental Quality (DEQ). These rules mainly pertain to treatment requirements at each wastewater treatment plant (WWTP) and recycling practices for the treated effluent and biosolids. If the City were to pursue a discharge of treated effluent to Willow Creek, water quality standards (WQS) established by the DEQ for the Deschutes Basin would apply. The City would also need to obtain a different type of operating

permit from the DEQ under the National Pollution Discharge Elimination System (NPDES).

**Guidelines on Airport Impacts.** The existing WWTP located adjacent to the municipal airport is affected by Federal Aviation Administration (FAA) guidance that recommends constraints on land used near airports. These FAA guidelines would impact potential WWTP expansions due to concerns about the attraction of wildlife and any expansion plans would require FAA review.

## **S.2 EXISTING FACILITIES**

### **S.2.1 Descriptions**

**General.** Madras began providing centralized WW service in 1975 with the construction of a collection system and WWTP. Since then, the City has constructed expansions that have reshaped these facilities. The main elements of the existing facilities serving Madras are listed below:

- Two separate collection systems that receive and convey sewage to the City's two WWTPs.
- The North and South Wastewater Treatment Plants (NWWTP and SWWTP).
- Storage ponds and transmission systems that support effluent recycling as irrigation water on farmland and the municipal golf course.
- A supervisory control and data acquisition (SCADA) system.
- Onsite WW treatment and disposal systems on properties not served by or connected to a sewer.

**Collection Systems.** The City's WW facilities include a Main Collection System serving most of the City and a smaller Industrial Park Collection System. The smaller system serves the industrial/commercial area near the airport plus a group of residences north of Birch Lane and east of the Municipal Golf Course.

Major components of the two collection systems include approximately 208,000 linear feet of gravity sewers, 878 manholes, five pump stations, and close to 43,800 linear feet of force mains.

**NWWTP.** The NWWTP was constructed as part of the City's original WW facilities and is located on the southwest side of the airport. Upgrades to the plant were completed in the 1990s, but most original components remain in services. The plant capacity is 0.50 million gallons per day (MGD). The main treatment process is a lagoon system that provides biological treatment. During cold weather, lagoon effluent is pumped to an open pond for storage. During the growing season, clarification and disinfection

equipment provide additional treatment before the effluent is recycled through irrigation of City-owned farmland and the Desert Peaks Golf Course.

**SWWTP.** The SWWTP was constructed in 2001 as part of the improvements recommended in the 1996 WWMP. The plant site is located on the south side of J" Street, between Willow Creek and Grizzly Road. The City expanded the facility in 2008 to treat flows from the DRCI and the current capacity is 0.54 MGC. The plant is configured to accommodate another expansion. A sequencing batch reactor (SBR) process provides biological treatment and cloth filters polish the SBR effluent. Disinfection equipment provides final treatment before the effluent is either pumped to a storage pond or used to irrigate the adjacent, City-owned farmland.

### **S.2.2 Condition Assessments**

**Gravity Sewers and Force Mains.** Available information indicates the sewers, force mains and appurtenances in the two collection systems are generally in adequate to good condition. Our analysis also shows the pipes have adequate capacity to handle existing WW flows generated in the city, plus the design flows from the DRCI when that facility is fully occupied. Age should only become a concern for the existing pipes near the end of the 20-year planning period.

**Pump Stations.** Age and condition concerns for each collection system pump station (PS) are outlined below. The City will need to implement PS renovations during the planning period.

- "B" Street PS North. Originally constructed in 1975; overall in poor to good condition. The main areas of concern are the age of original components from the 1970s and pump clogging.
- "B" Street PS South. Constructed in 2001; overall in adequate to good condition. The main area of concern is rusting of valves and piping in the valve vault.
- "B" Street Standby Generator Facilities. Constructed in 1999; overall in good condition.
- South 97 PS. Age not available; overall in adequate to good condition. The pumps operate infrequently due to low incoming flows. The main area of concern is rusting of valves.
- Golf Course PS. Constructed in 1996; overall in poor to adequate condition. The main areas of concern are the age of the existing facility, the condition of the pumps and valves, and the lack of a SCADA unit for remote monitoring of alarms.
- Demers PS. Constructed in 1989-90; overall in poor to adequate condition. The pumps had to be replaced in 2017 after the condition assessment was performed for this study. The main areas of concern are heavy corrosion and overall wear on components in the valve vault.

**NWWTP.** The condition of the NWWTP is generally adequate and some equipment has recently been replaced. Although the replacement aerators the City recently installed are used units. Overall, due to the age of most components, the facility will require major renovations during the planning period to continue to provide reliable service. Since some condition issues would need to be addressed sooner than others, a phased upgrade would be appropriate. Key condition issues with the NWWTP are summarized below:

- No influent screening to remove debris that can accumulate in the lagoons.
- Sediment buildup in the lagoons that reduces the available volume for treatment.
- Deteriorated components at the lagoon transfer/outlet structures.
- The age and the outdoor location of the clarifier process. Because the equipment is subject to freezing in cold weather, the City cannot operate the process during the winter.
- Some pumping equipment and instrumentation is old and in need of replacement.
- The main electrical service components should be replaced within 10 years.

**SWWTP.** The overall condition of the SWWTP is good. Structural components and yard piping should generally be adequate for the next 20 years and beyond. The age of most equipment will not become a concern for about 10 years. However, there are some key condition and operating issues that should be addressed within the next 3 years. These are listed below:

- Control system hardware and software components are either obsolete or soon will be.
- The fine-bubble, diffuser tubes in the SBR basins are at the end of their service life.
- The SBR effluent control valves for the two SBR basins do not close tightly and leak.
- The filter backwash pump and skid are heavily corroded and the electric actuators on the control valve may also be subject to corrosion due to their location in a below-grade gallery.
- The performance and efficiency of the aerobic digester process can be improved by installing dissolved oxygen (DO) probes in the digesters and adding new DO control programming.

### **S.2.3 Maintenance Plan Recommendations**

Recommendations for completing major maintenance tasks and corrective work were developed in cooperation with the City and are presented in this study. The items covered by the recommended plans are non-routine tasks that typically must be performed by outside contractors or repair shops. Routine preventive maintenance tasks are not included in the plan recommendations.

### **S.3 BASIS OF PLANNING**

#### **S.3.1 Population and Dwelling Units**

Table S-1 (following page) lists the population forecasts published by the Portland State University Population Research Center (PSU), as well as the corresponding numbers of dwelling units (DUs). Census data shows the average unit occupancy was about 2.7 people per household (PPH) in 2010 and this unit occupancy is anticipated to decline in the future. Therefore, this study used 2.6 PPH to estimate a projected in 2035.

<b>Table S-1</b>			
<b>Madras UGB Forecasts for Population and DUs</b>			
<b>Year</b>	<b>Population</b>	<b>Occupied DUs (1)</b>	<b>AAGR (2)</b>
2015	7,484 (3)	2,880	---
2020	8,070	3,105	1.52%
2025	8,700	3,345	1.51%
2030	9,268	3,565	1.27%
2035	9,815	3,775	1.15%
2065	12,749	4,905	0.88%

(1) Forecasts for occupied DUs based on an average unit occupancy of 2.6 PPH.

(2) AAGR is calculated for each incremental 5-year period to 2035 and for the 30-year period from 2035 to 2065.

(3) PSU 2015 population estimate for entire area within UGB.

#### **S.3.2 Wastewater Flows**

Records for 2010 through 2014 indicate that the aggregate, average unit flow from all users, residential and nonresidential, is approximately 200 gallons per day (gpd)/DU. We applied a factor of 1.2 to this average unit flow to estimate a peak-monthly unit flow of 240 gpd/DU. Consistent with recent planning forecasts, the WW flow projections in this study assume nonresidential growth will be proportional to residential growth. Therefore, the overall flow per DU is projected to remain constant over the planning period.

Table S-2 lists the WW flow projections used in this study. The WWMP assumes the

DRCI will produce its full design flow throughout the planning period due to the absence of any population or flow projections from the Department of Corrections.

<b>Table S-2</b>					
Wastewater Flow Projections for Madras UGB					
	Flows (MGD) (1)		Prison Flows	Total Flows (MGD)	
Year	Avg. Annual	Peak Month	(MGD) (2)	Avg. Annual	Peak Month
2020	0.55	0.66	0.23	0.78	0.89
2025	0.67	0.80	0.23	0.90	1.03
2030	0.71	0.86	0.23	0.94	1.09
2035	0.76	0.91	0.23	0.99	1.14
2065	0.98	1.18	0.23	1.21	1.41

(1) Average annual and peak monthly flows based on 200 and 240 gpd/DU, respectively.

(2) Prison flow based on dedicated capacity allotted to prison by agreement with ODOC.

To be conservative, the flow projections for the Year 2025 and beyond assume the entire population within the UGB will be served. The forecasts for 2020 assume sewer service will be extended to 25% of the projected population outside the City, but inside the UGB.

### **S.3.3 Wastewater Strength**

We used estimates of the influent WW strength along with flow capacity to establish the basis of planning for WWTP expansions. Concentrations of five-day biochemical oxygen demand (BOD) and total suspended solids (TSS) are the parameters used for this purpose. Data for both WWTPs and the prison show the following WW strengths are appropriate for planning treatment needs.

- NWWTP – Combined flows: 300 mg/L average BOD and TSS concentration
- SWWTP – City flows: 250 mg/L average BOD and TSS concentration DRCI flows: 750 mg/L average BOD and TSS concentration
- 

## **S.4 ANALYSIS OF COLLECTION SYSTEMS**

### **S.4.1 Sewer Modeling**

**General.** Computer models of the City’s two collection systems were generated using the InfoSWMM program to analyze sewer-pipe capacities. Sewer data were obtained from the 1996 WWMP model, available City records, and field investigations. We

executed models to analyze sewer capacities under both existing and projected flow conditions. Estimated peak flows were input to the models using estimated distributions of tributary dwellings, the estimated average flow per DU, and a peaking factor. Proposed developments inside the UGB and input from the City were used as the basis for distributing future tributary DUs. Most existing DUs not connected to the existing systems were added into the models of future conditions. Only the unserved, existing homes most distant from existing sewers were excluded because of the low probability sewers will be extended to these areas within 20 years.

**Modeling Results – Main Collection System.** The model of existing conditions confirmed the sewers have enough capacity to convey peak flows to the “B” Street Pump Stations and the WWTPs. The model of projected flows showed the following two sections of existing sewers will have insufficient capacity under future conditions.

- North Y Sewer. The 8-inch interceptor sewer extending southwest from U.S. 97 at Cedar Street to the intersection of 4th and Maple Streets.
- Culver Highway Sewer. The 8-inch interceptor sewer extending along Marshall Street, Culver Hwy. and 1st Street, between “G” and “B” Streets.

**Modeling Results – Industrial Park Collection System.** The model of existing conditions confirmed the existing sewers have enough capacity to convey peak flows to the Demers PS and NWWTP. A model of future conditions with projected flows from the planned Willowbrook development also showed no capacity deficiencies in the existing sewers.

As part of industrial site readiness planning, we performed additional analyses to address the impacts of major industrial developments contributing high WW flows. We applied a 1.0-MGD average flow with a peaking factor to model future flows from three currently-undeveloped areas in the industrial park. The modeling results show the existing sewers serving these three selected areas do not have enough capacities to convey peak flow from such major users.

The parallel sewers required to carry the major WW contributions we modeled from each area are listed below. These potential sewers are identified to support industrial site readiness planning. The size, length and alignment of a parallel sewer will depend on actual development plans.

- East Area – Approximately 4,800 linear feet of 15-inch parallel sewer along Cherry Lane.
- South Area – Up to 2,400 linear feet of 18-inch parallel sewer along Demers Drive.
- North Area – Approximately 2,240 linear feet of 18-inch parallel sewer along



Airport Way.

#### **S.4.2 Sewer Extensions**

**Main Collection System.** Gravity sewers need to be installed in several unsewered areas to extend service to existing housing developments. New sewer extensions will also be needed in three locations to serve proposed housing developments not immediately adjacent to existing sewers. These proposed sewer extensions are listed below.

- Extensions into Existing Unsewered Areas: Bel Air/Herzberg Heights (~5,100 linear feet); Jefferson Street/North Unit (~2,900 linear feet); Mountain View/Sky Ridge (~4,500 linear feet); and Juniper Heights (~5,350 linear feet).
- Extensions to Reach Proposed Developments: Willow Creek North (~2,500 linear feet); Madras South Town Center (~2,400 linear feet); and Eldorado Estates/The Ridge (~1,800 linear feet).

The pipe size for all the above-listed sewers would be 8-inch. The sewer lengths listed for extensions to future developments exclude the sewers required within the developments since those would be installed by developers.

**Industrial Park Collection System.** The City has identified two sewer extensions in the Industrial Park to serve infill locations. These projects include 8-inch sewers extending along Hess Street and Mill Street for about 1,670 and 1,430 linear feet, respectively.

#### **S.4.3 Pump Stations**

The collection system pump stations and their associated force mains all have adequate capacity for existing conditions. However, PS improvements will be required during the planning period to condition and/or capacity issues. The following paragraphs summarize projected PS needs.

- “B” Street PS North. The “B” Street North PS will need a renovation to replace aging components in 11 to 15 years.
- “B” Street PS South. Due to age and wear, the City should plan to replace some components within 20 years. This PS may also need to be expanded when the SWWTP is expanded.
- “B” Street Standby Generator. The generator equipment is projected to require a major overhaul or replacement within 15 years. Renovation work on the Generator Building should also be scheduled at that time.

- South 97 PS. The City should plan to renovate this PS in 6 to 10 years.
- Golf Course PS. The Golf Course PS will need to be replaced when development of the Willowbrook subdivision proceeds. If that development does not occur, the City should plan to replace the existing PS within 10 years due to its age and condition.
- Demers PS. The City should plan to replace components in the valve vault and rebuild the pumps in 3-5 years. The City should plan the complete replacement of the PS in 16-20 years.
- 

## **S.5 TREATMENT ALTERNATIVES DEVELOPMENT AND SCREENING**

### **S.5.1 Background for Alternatives Development**

**NWWTP.** Key factors in developing alternatives for the NWWTP are outlined below.

- The existing lagoon system has relatively low operations and maintenance (O&M) costs.
- The facility is strategically located close to both the Industrial Park and farmland used for effluent recycling.
- The NWWTP requires renovation to keep the facility in operation for another 20 years.
- FAA guidelines identify WWTPs as potential wildlife attractants that should not be located near airports unless acceptable mitigation measures are implemented.
- The shallow depth to underlying rock in the area significantly impacts construction costs.

**SWWTP.** Key factors in developing alternatives for the SWWTP are outlined below.

- The plant has significant useful service life remaining and should provide reliable service for the next 20 years with scheduled renovations of existing equipment .
- The facilities are designed to accommodate another expansion with common-wall construction.
- The site accommodates gravity flow from sewers in the east and southeast parts of the City. Pumping flows from these gravity sewers to a remote site would require costly upgrades.

- The SBR process has higher O&M costs relative to a lagoon system, but requires far less land.

**Effluent Uses.** The City has always reused treated effluent for irrigation purposes and has never obtained a permit for a surface-water discharge. Incentives for the City to continue the practice of effluent recycling include a successful track record, the local availability of farmland, and a favorable and stable regulatory climate for this beneficial reuse. Given the above-listed incentives, the scope of this study is based on the premise the City would continue the current practice of effluent recycling. Therefore, this WWMP Update includes only a preliminary examination of the issues impacting a surface-water discharge. The City would need to have a separate study prepared to investigate the feasibility of a direct or indirect discharge to Willow Creek. Such a feasibility study would need to examine discharge options, the impacts of WQS, DEQ guidance, potential treatment requirements, site constraints, and related issues. At this point, it is uncertain whether DEQ would approve a Willow Creek discharge.

**Biosolids Handling.** Existing biosolids treatment systems include aerobic digesters at the SWWTP and sludge drying beds at the NWWTP. These facilities have adequate capacity for current solids production and are generally in good condition. The City spreads the dried solids as Class B biosolids on City-owned farmland.

**S.5.2 Basis for Treatment and Storage Requirements**

Influent WW Flow. Table S-3 lists the maximum-monthly and peak-hourly flow projections identified from the basis of planning. The net available treatment capacity listed to the right is the difference between the maximum-monthly flow projection and the existing combined WWTP capacity. Maximum-month flows are projected to reach existing capacity in about 10 years.

<b>Table S-3</b>			
Wastewater Treatment Capacity Requirements			
	Projected Total Flows (MGD) (1)		
Year	Maximum Monthly	Peak Hourly	Net Available ADF Capacity (2)
2020	0.89	2.43	0.15
2025	1.03	2.75	0.01
2030	1.09	2.91	- 0.05

2035	1.14	3.04	- 0.10
2065 (build-out)	1.41	3.76	- 0.37

(1) Flow projections assume full occupancy of the DRCI and nonresidential flows will increase in proportion with projected growth in residential flows.

(2) Based on the existing total ADF capacity of 1.04 MGD.

**Treatment Level.** The development of alternatives was based on the premise that the City would continue the following practices:

- Treat WW to produce Class B effluent for recycling by irrigation.
- Process biosolids to produce dried, Class B biosolids for recycling by spreading on farmland.

**Effluent Storage.** Since effluent can only be recycled during the growing season, all alternatives would require storage capacity for about 6 to 6.5 months of treated effluent. The effluent storage pond needed for each 0.5-MGD of treatment capacity would require a gross area of about 30 acres.

**Solids Handling.** The continued practice of land applying Class B biosolids is the recommended option at this time and was used as the basis for alternatives development. This conclusion is based on the current conditions and capacities of the existing biosolids handling facilities, as well as the availability of farmland.

### **S.5.3 Overall Treatment Scenarios**

We identified and screened five overall WW treatment scenarios for serving the City over the next 20 years. These alternative scenarios are summarized below:

- Scenario One – No expansion; renovate existing WWTPs to maintain current capacity.
- Scenario Two – Abandon both existing plants and construct one or two new WWTPs.
- Scenario Three – Abandon one WWTP and expand the other to treat all flows.
- Scenario Four – Maintain one WWTP at its current capacity and replace or expand the other.
- Scenario Five – Implement modifications to both WWTPs to expand the capacity of each.

Initial screening eliminated Scenarios One, Two and Three from further evaluation

because they are not suitable for the City’s planning needs. The City should plan for a small, capacity expansion to treat projected flows and additional expansions to serve potential growth in the Industrial Park. At this time, the City should also plan to maintain both WWTPs in service.

Our evaluation shows either Scenario Four or Scenario Five could fit projected WW service needs. However, accelerated industrial development may drive expansions to both plants. Therefore, to address industrial site readiness, we selected Scenario Five as the preferred overall treatment scenario for planning purposes. Table S-4 summarizes the recommended overall treatment scenario.

<p><b>Table S-4</b> Preferred Overall Treatment Scenario</p>
<p>Expand SWWTP to Treat Projected Flows and Dedicate NWWTP to Serve North Area</p>
<p>1. Phased improvements to the SWWTP.</p> <ul style="list-style-type: none"> <li>• Phase 1. Modify the plant to provide a small increase in capacity to 0.65-MGD and renovate the existing facilities as needed to maintain reliable service.</li> <li>• Phase 2. If necessary, construct the additional 0.5-MGD treatment module for which the SWWTP is designed to provide a total 1.14-MGD ADF capacity. This second phase would free up capacity at the NWWTP to serve industrial developments.</li> </ul>
<p>2. Renovate, retrofit, or replace the existing NWWTP to maintain the 0.5-MGD capacity. After SWWTP expansions, the NWWTP would be dedicated to serving the North Area and would be expanded as necessary to serve Industrial Park developments.</p>

The proposed Phase 1 SWWTP expansion would provide an overall treatment capacity that meets the 20-year flow projection. The Phase 2 SWWTP expansion would free-up the entire NWWTP capacity to serve the North Area. This additional expansion would only be necessary if industrial development creates the need for more capacity than currently projected. Otherwise, Phase 2 for the SWWTP would not be justified.

**S.5.4 Improvements to Existing NWWTP**

An upgrade of the NWWTP is part of the overall treatment scenario because improvements must be made within the planning period to maintain reliable service. The plant could be renovated to keep existing treatment processes in service, retrofitted to modify existing processes, or replaced with a new facility.

The following options for upgrading the 0.5-MGD lagoon system were evaluated in coordination with the alternatives evaluation for future NWWTP expansions. Upgrades and/or replacements of the clarification and disinfection systems would be part of each approach.

1. Full Renovation. Renovate the existing lagoons to maintain the same capacity and footprint.
2. Partial Renovation. Renovate half the lagoon system to provide a 0.25-MGD and construct an adjacent treatment module to maintain or expand capacity.
3. Retrofit to Maintain Capacity and Reduce Footprint. Retrofit half the existing lagoon system with a new, higher-rate system to maintain a 0.5-MGD capacity in about half the existing lagoon footprint.
4. Retrofit to Increase Capacity. This retrofit option would convert both primary lagoons to aerated lagoons in two phases to double the plant capacity within the existing footprint.
5. Complete Replacement. Construct a new 0.5-MGD WWTP adjacent to the existing facility and abandon all existing components.

Modifications to the NWWTP must address FAA constraints on the siting of wildlife attractants near airports. Plans for any modifications would need to be submitted to FAA for review and, if costly mitigation measures are mandated, the City may need to investigate alternative sites.

### **S.5.5 Alternative Treatment Processes for NWWTP Expansions**

As a first step in determining the most cost-effective approach to expanding the NWWTP, we conducted a technology review to identify alternatives that should be screened for further evaluation. This review identified treatment processes that have been found to be suitable for the required plant size and treatment level in Madras.

We then screened the alternatives we identified by evaluating and comparing the processes with regard to O&M considerations, treatment reliability, safety considerations, and siting constraints. These criteria were used to eliminate processes that do not fit this application well and identify the alternatives that have the potential of being cost effective solutions for Madras. Table S-5 lists the alternatives that remained after the initial review and screening efforts. These processes were further evaluated in a cost-effectiveness analysis using more detailed criteria.

<b>Table S-5</b> NWWTP Alternatives Recommended for Further Evaluation
---

1. Preliminary Treatment at Headworks: Mechanically-Cleaned Screen and Low-Energy, Vortex Grit Chamber
2. Secondary Treatment <ul style="list-style-type: none"> <li>a. Renovation of existing Partially-Aerated, Facultative Lagoon System (no stabilization)</li> <li>b. Aerated/Partially Mixed Lagoon System – retrofit and expansion (no stabilization)</li> <li>c. Oxidation Ditch Extended Aeration</li> <li>d. Compact Extended Aeration Process Configuration</li> <li>e. SBR Extended Aeration</li> </ul>
3. Disinfection <ul style="list-style-type: none"> <li>a. Sodium Hypochlorite Bulk Storage and Feed</li> <li>b. Onsite Sodium Hypochlorite Generation and Feed</li> <li>c. Tablet Chlorination (Calcium Hypochlorite) Equipment</li> </ul>
4. Biosolids Stabilization: Aerobic Digestion
5. Biosolids Dewatering: Sludge Drying Beds

## **S.6 EVALUATION OF TREATMENT ALTERNATIVES**

### **S.6.1 Overview of Alternatives Evaluation**

Evaluations of WWTP alternatives were completed in two stages. We first evaluated the alternative processes for NWWTP expansions that remained after screening. Then we evaluated alternatives for renovating, retrofitting or replacing the existing NWWTP in coordination with expansions. We evaluated the alternatives by comparing probable present worth costs, O & M requirements, land use impacts, treatment reliability, operating flexibility, and sustainability. Probable present worth costs include estimates of construction costs, annual O&M costs and salvage values after 20 years. Our analysis used December 2016 dollars.



### **S.6.2 Development of Alternatives for Secondary Treatment and Disinfection**

Preliminary process sizing and layouts were developed for the alternatives that remained after the screening effort and were used to estimate probable life-cycle costs. Each alternative secondary process requires the following support facilities to provide complete systems.

- a headworks for preliminary treatment;
- secondary clarifiers for biosolids separation and removal;
- aerobic digesters for biosolids stabilization;
- building to house accessory equipment and process controls; and
- sludge drying beds for biosolids dewatering and land application of Class B biosolids.

All disinfection alternatives include a building to house the process equipment, piping and controls.

### **S.6.3 Summary of Secondary Process Alternatives Comparison and Ranking**

We compared the secondary alternatives using both our estimates of probable, present-worth costs and the nonmonetary criteria. The aerated lagoon process had the highest overall ranking based on these criteria and the SBR process, with similar life-cycle costs, was a close second. The other two processes, oxidation ditches and compact extended aeration, had significantly higher life-cycle costs and were ranked lower.

Based on our evaluation, an aerated lagoon system is the most cost-effective secondary treatment alternative to implement at the NWWTP. The main advantages to this process

are the lower O&M requirements and the associated cost savings relative to the other alternatives. Therefore, we recommend that the City implement aerated lagoons as the secondary treatment process for a retrofit or replacement of the existing NWWTP and for plant expansions. Overall, aerated lagoons and SBRs rank close in both costs and nonmonetary factors. If the Federal Aviation Administration (FAA) requires covers over lagoons and basins, then the SBR process could be worth further consideration due to its smaller footprint.

### **S.6.4 Summary of Disinfection Alternatives Comparison and Ranking**

Using both monetary and nonmonetary considerations, our analysis identified the tablet chlorination system as the most cost effective disinfection alternative. A tablet chlorinator

is estimated to have a lower life-cycle cost and about 20% lower O&M costs than the bulk storage and feed system the City currently uses.

### **S.6.5 Evaluation of Alternatives for Existing Facilities**

General. As previously described, the City will need to renovate, retrofit, or replace the existing facility within 15 years. We evaluated alternatives for upgrading the NWWTP in conjunction with an expansion to identify a preferred approach for addressing condition issues while maintaining industrial site readiness. Aerated lagoons were incorporated into the alternatives evaluation as the recommended secondary treatment process for expansions, consistent with our analysis of process alternatives.

The evaluation compared alternatives for providing an expanded NWWTP capacity of 1.0 MGD and also considered site requirements for an additional expansion to 1.5 MGD. The main considerations in evaluating alternative NWWTP upgrades are summarized below:

- the pace of development in the North Area;
- the need for flexibility to accommodate expansions for maintaining industrial site readiness;
- the impacts on the airport that expansions of open lagoons would have;
- the recommended secondary treatment alternative for NWWTP expansions; and
- the availability of farmland near the NWWTP for effluent recycling by irrigation.

Alternatives for Upgrading and Expanding the NWWTP. The alternative approaches to upgrading and expanding the existing NWWTP are summarized below.

#### 1. Option 1 – Full Renovation of Lagoon System and Adjacent Expansion.

- Renovate the existing lagoons in phases to maintain a 0.5-MGD capacity in the same area.
- Expand the capacity to 1.0 MGD by constructing a 0.5-MGD aerated lagoon module and additional effluent storage capacity on adjacent land.

#### 2. Option 2 – Partial Renovation Combined with Adjacent Expansion.

- Renovate half the lagoon system to provide a 0.25-MGD capacity. To expand to 1.0 MGD, construct a 0.75-MGD aerated lagoon module on adjacent land.

- The remainder of the existing lagoon system could be converted to an effluent storage pond as part of the expansion to reduce the required area outside the existing footprint for effluent storage.

3. Option 3 – Retrofit to 0.5-MGD Aerated Lagoons with Adjacent Expansion.

- Retrofit one primary cell of the existing lagoon system to convert it to a 0.5-MGD aerated lagoon system. This retrofit would use a more intensive process to reduce the volume required for a 0.5-MGD capacity.
- Adjacent aerated lagoons would be constructed for expansions and the remainder of the existing lagoon footprint would be converted to effluent storage.

4. Option 4 – Retrofit to Increase Capacity with Aerated Lagoons.

- This retrofit option would convert both existing primary lagoons to the higher-rate aerated lagoons in two phases to double the plant capacity to 1.0 MGD within the existing footprint.
- Effluent storage capacity would need to be constructed on adjacent land for the expansion.
- 

5. Option 5 – Complete Replacement with New Facility.

- This option would replace the existing facilities with an entirely new 0.5-MGD WWTP. The replacement facilities would consist of the same aerated lagoon and disinfection processes we recommend for expansions.
- The existing lagoon footprint would be converted to effluent storage when the plant is expanded to 1.0 MGD.

**Common Facilities.** Each option would include new headworks, clarification and disinfection equipment, pumps, and valves. The clarifiers would be housed in a new process building for weather protection. The existing sludge drying beds would be expanded when necessary.

**Probable Costs for NWWTP Alternatives.** Our estimates show the probable present worth costs for Options 1 and 4 are essentially equal and the probable present worth costs for the other three options are estimated to be 5% to 11% higher.

**Recommended Approach to NWWTP Upgrades and Expansions.** We recommend the City plan to implement Option 4, a phased retrofit to upgrade and expand the NWWTP

with aerated lagoons, for the following reasons.

- Option 4 is estimated to have lower O&M costs than the other alternatives while the life-cycle costs are estimated to be approximately equal to Option 1 and lower than the other options.
- Option 4 would eliminate the larger facultative lagoons (secondary cells) that would remain under both Options 1 and 2. Facultative lagoons not only require more area, they also are more prone to algae growth and more likely to act as wildlife attractants.
- There is considerable flexibility in how the aerated-lagoon retrofits can be configured and the types of equipment that can be installed. This provides flexibility in tailoring the design capacity of the retrofits to actual development conditions.
- Aerated lagoons receive more aeration and mixing than the existing lagoon system. This reduces algae growth and provides a less attractive environment for water fowl due to greater surface agitation.

We recommend the implementation of the 0.5-MGD retrofit in phases due to limitations in funding and differing priorities for component replacements. The recommended phasing, our estimates of probable project costs for each phase, and project timing are presented in the capital improvements plan.

## **S.7 EFFLUENT STORAGE AND RECYCLING**

### **S.7.1 General**

We developed estimates for future effluent storage and farmland requirements based on the assumption that the City will continue to recycle all effluent flows with no surface water discharge. The following paragraphs summarize our estimates of these projected needs.

### **S.7.2 Effluent Storage Volume Requirements**

**Volume Requirement.** Our calculations show an effluent storage volume of 79 MG is required in Madras for each 0.5-MGD in average treatment capacity. This estimated volume is based on a water-balance using records for the maximum annual precipitation (1983) and minimum annual evaporation (1993).

**NWWTP Effluent Storage.** Currently, the NWWTP includes one 79-million gallon (MG) storage pond. This means there is adequate volume for the existing capacity, but no surplus storage volume. Therefore, a plant expansion to 1.0 MGD would require the storage volume to be doubled.

**SWWTP Effluent Storage.** There are two existing storage ponds near the SWWTP with

a total volume of 113 MG. This translates to a surplus storage volume of 28 MG at the current design capacity and a 10-MG surplus volume after the recommended expansion to 0.65 MGD. A Phase 2 expansion to 1.15 MGD would require 70 MG of additional storage volume. The existing site of the upper storage pond for the SWWTP has room for the future addition of another pond.

### **S.7.3 Existing Land Available for Effluent Recycling**

**NWWTP Sites.** The City owns 373 acres of farm fields around the airport that can potentially be used to recycle NWWTP effluent and the municipal golf course has about 75 acres that can be irrigated. Not all of the irrigation demands for crops and the golf course are satisfied using effluent. Water from the North Unit Irrigation District (NUID) is used to supplement recycled effluent.

Some farmland is designated for future development in the Industrial Park and around the airport. Overall, about 250 gross acres of farmland would be lost, if full development occurs and the NWWTP were expanded to a 1.5 MGD capacity. Alternatively, there are tentative plans to expand the golf course and potentially increase available land for irrigation.

**SWWTP Sites.** The City owns 304 acres of land near the SWWTP that can potentially be used for effluent recycling. Currently, 111 acres are available for irrigation. The other 193 acres are currently unimproved and are planned as a future golf course site that would be irrigated with recycled effluent. If the land is not developed as a golf course before the City needs it for SWWTP effluent recycling, this site could be used as farmland.

### **S.7.4 Farmland Requirements for Effluent Recycling**

**General.** We estimated the amount of farmland required for future effluent volumes based on information presented in the effluent reuse plans previously prepared for the City. We also updated the information in these reuse plans based on input from the City regarding effluent uses.

Effluent use for irrigation was estimated using water demand for alfalfa as an average condition. Grass crops generally have higher water demands and grains generally require lesser amounts. Costs for securing additional irrigable land will depend on several factors and further study into available options will be needed to develop planning-level estimates of probable costs.

**NWWTP Recycling Farmland Requirements.** We project the NWWTP would have a farmland surplus of approximately 70 acres when peak monthly flows reach 0.50 MGD. This estimate accounts for the potential loss of fields inside the UGB due to commercial/industrial development. The surplus farmland would accommodate a design flow up to about 0.65 MGD. Our projections show the NWWTP site would face a farmland deficit of about 190 acres and 610 acres at future flows of 1.0 MGD and 1.5

MGD, respectively. These deficits would be less, if commercial/industrial development of farmlands does not occur to the extent we assumed or, if more of the golf-course demand can be met with recycled water in the future.

**SWWTP Recycling Farmland Requirements.** We project the City would need to make about 125 acres of the upper parcel available as irrigable farmland to recycle the current SWWTP capacity of 0.54 MGD. Therefore, the City should plan to make the future golf course parcel available for irrigation in 6 to 10 years or sooner, if flow contributions from DRCI begin to increase significantly.

With the entire upper parcel available for irrigation as farmland, the City would have a surplus of about 28 acres when peak monthly flows reach an expanded capacity of 0.65 MGD. We project a farmland deficit of almost 180 acres if the City constructed a Phase 2 SWWTP expansion and peak monthly flows reached 1.15 MGD. This deficit could be reduced, if the future golf course is developed as planned and effluent is used to meet most or all of the irrigation demand. This is because water demands are higher for turf grass than alfalfa.

## **S.8 RECOMMENDED IMPROVEMENTS AND PLANNING CONSIDERATIONS**

### **S.8.1 Capital Improvements Plan**

The projects identified in the capital improvements plan (CIP) and the anticipated project timing are listed below. Actual project schedules will depend on a variety of factors.

1. **Gravity Sewer Projects.** The CIP identifies 10 gravity sewer projects for the collection systems with an estimated total probable project cost of \$ 7,821,000. These improvements and the projected time frames for their implementation are listed below.
  - A. Within 5 years: The North Y sewer replacement to increase capacity and three projects to bring service to unsewered residential areas (Mountain View/Sky Ridge, Jefferson Street/North Unit and Bel Air/Herzberg Heights).
  - B. In 6-10 years: Two sewer extension projects in the Industrial Park to serve unsewered pockets of land along Hess and Mill Streets.
  - C. In 11-15 years: The Culver Highway parallel sewer to increase system capacity.
  - D. In 16-20 years: The Juniper Heights project to bring service to that unsewered residential area and the Willow Creek North sewer extension to provide service to future developments.
  - E. Industrial Site Readiness Planning: The potential North Area-Airport Way parallel sewer project as the least-cost alternative to serve a major WW contributor in the Industrial Park (timing is development dependent).

2. **Pump Station and Force Main Projects.** The CIP identifies the following PS and force main projects for the two collection systems. The estimated total probable project cost of these improvements is \$5,555,000.

A. Within 5 years: No projects identified.

B. In 6-10 years: The Golf Course PS replacement with capacity expansion for the planned Willowbrook subdivision (project would be sooner if the Willowbrook development proceeds).

C. In 11-15 years:

- “B” Street North PS renovation with no capacity expansion.
- Generator replacement at the “B” Street pump stations.
- South U.S. 97 PS Renovation with no capacity expansion.

D. In 16-20 years:

- Demers PS replacement with allowance for future expansion(s).
- “B” Street South PS renovation and expansion.

E. Industrial Site Readiness Planning: Potential force main replacement project from Demers PS to NWWTP when PS capacity is expanded beyond 0.70 MGD (timing is development dependent).

3. **WWTP Projects.** The CIP identifies the following WWTP and effluent storage projects. The estimated total probable project cost of these improvements is \$77,315,000. These improvements are based on the City continuing the current practice of recycling Class B effluent on farmland and the golf course. The NWWTP projects also are contingent on FAA reviews and acceptance.

A. Within 5 years: NWWTP Phase 1A improvements to allow reliable year-round operation of the clarifier, disinfection and pumping equipment.

B. In 6-10 years:

- A SWWTP expansion to increase average design capacity to 0.65 MGD and partial renovation to upgrade aging equipment.
- A SWWTP irrigation system expansion to accommodate effluent recycling and crop production on the 193-acre site of the future golf course east of the SWWTP site.

C. In 11-15 years: NWWTP Phase 1B improvements to retrofit the existing lagoon



system with an aerated lagoon system and related facilities with no capacity expansion.

D. In 16-20 years: SWWTP Phase 2 expansion and renovation to increase average design flow capacity to 1.15 MGD and to increase effluent storage capacity by 70 million gallons (MG).

E. Industrial Site Readiness Planning (timing is development dependent):

- Potential NWWTP Phase 2 expansion to increase average design capacity to 1.0 MGD and increase effluent storage capacity by 79 MG.
- Potential NWWTP Phase 3 expansion to increase average design capacity to 1.5 MGD and increase effluent storage capacity by 79 MG.

Table S-6 summarizes the estimated probable project costs for each major project category (sewers, PS and force mains, and WWTPs).

<b>Table S-6</b>		
Capital Improvements Summary Estimates of Probable Costs and Anticipated Timing (1)		
<b>Project Description</b>	<b>Probable Construction Cost</b>	<b>Probable Project Cost</b>
<b>A. Short-Term Projects (within 5 years)</b>		
1. Gravity Sewer Projects	\$ 2,703,000	\$ 3,650,000
2. Pump Station and Force Main Projects	None Identified	
3. WWTP and Effluent Recycling Projects	\$ 1,710,000	\$ 2,310,000
<b>Subtotal for Short-Term Projects</b>	<b>\$ 4,413,000</b>	<b>\$ 5,960,000</b>
<b>B. Mid-Term Projects (6 – 10 years)</b>		
1. Gravity Sewer Projects	\$ 466,000	\$ 629,000

2. Pump Station and Force Main Projects	\$ 350,000	\$ 475,000
3. WWTP and Effluent Recycling Projects	\$ 1,262,000	\$ 1,705,000
<b>Subtotal for Mid-Term Projects</b>	<b>\$ 2,078,000</b>	<b>\$ 2,809,000</b>
<b>C. Mid- to Long-Term Project (11 – 15 years)</b>		
1. Gravity Sewer Projects	\$ 543,000	\$ 733,000
2. Pump Station and Force Main Projects	\$ 814,000	\$ 1,100,000
3. WWTP and Effluent Recycling Projects	\$ 5,890,000	\$ 7,950,000
<b>Subtotal for Mid- to Long-Term Projects</b>	<b>\$ 7,247,000</b>	<b>\$ 9,783,000</b>
<b>D. Long-Term Projects (16 – 20 years)</b>		
1. Gravity Sewer Projects	\$ 1,409,000	\$ 1,902,000
2. Pump Station and Force Main Projects	\$ 1,810,000	\$ 2,445,000
3. WWTP and Effluent Recycling Projects	\$ 13,792,000	\$ 18,620,000
<b>Subtotal for Long-Term Projects</b>	<b>\$17,011,000</b>	<b>\$22,967,000</b>
<b>E. Potential Industrial Site Readiness Projects</b>		
1. Gravity Sewer Projects	\$ 672,000	\$ 907,000
2. Pump Station and Force Main Projects	\$ 1,137,000	\$ 1,535,000
3. WWTP and Effluent Recycling Projects	\$ 34,612,000	\$ 46,730,000
<b>Subtotal for Long-Term Projects</b>	<b>\$ 36,421,000</b>	<b>\$ 49,172,000</b>
<b>Total – Proposed &amp; Potential Capital Projects</b>	<b>\$ 67,170,000</b>	<b>\$ 90,691,000</b>

(1) Refer to WWMP Chapter 8 for basis of estimating probable costs.

## **S.8.2 Additional Planning Considerations**

**Planning Effort for Surface-Water Discharge.** Before the City proceeds with the Phase 1

SWWTP expansion and renovation, it may be worthwhile to investigate the feasibility of an indirect discharge to Willow Creek. An early step in this effort would be to solicit input from the DEQ regarding the prospects for a discharge permit. Depending on DEQ's input, the City might then want to proceed with a feasibility study to evaluate the potential cost effectiveness of an indirect discharge to Willow Creek through constructed wetlands.

**Capacity, Management, Operations and Maintenance (CMOM) Program Planning.** The

intent of CMOM program planning is to support the City's efforts in properly managing, operating and maintaining the sewer systems and overall WW facilities it owns. The general goals of a formal CMOM program are as follows:

- Assure that adequate sewer capacity remains available.
- Develop a proactive (predictive) approach to system management, operations and maintenance.
- Provide quality customer service to generate and sustain support for adequate local investment in the WW facilities.

Since Madras has had centralized sewer service for over 40 years, the City has been following many recognized CMOM practices for an extended period. The City can improve current practices by conducting a thorough review of their CMOM practices, developing a written CMOM program, and establishing specific objectives for CMOM performance.

We recommend the City conduct an assessment of current CMOM practices to identify areas of improvement. The City should then establish performance objectives in coordination with current priorities for addressing areas of concern. The key is to clearly define the target objectives, develop a process for tracking progress, and determine whether staff can meet these objectives. The information presented in this WWMP Update can be used as a tool in CMOM program planning and regular WWMP updates can help keep CMOM activities current.

**Solar Power Array Funding and Partnering Opportunities.** Solar photovoltaic (PV) panels have become increasingly cost competitive as a way to generate electricity onsite and reduce the amount of electricity purchased from a utility. Due to the availability of State and Federal incentives, it may be cost effective for the City to install an array of PV panels at either or both WWTP sites as a means for lowering power costs.

To take advantage of tax incentives, a City could enter into a power purchase agreement (PPA) with a private, solar service provider. Under a PPA, the service provider would furnish, install, own and maintain the power-generating system. In exchange, the City would agree to purchase the electricity produced by the system for the term of the PPA. The main advantages to a PPA for the City include:

- low initial cost for a solar array;
- the ability to benefit from Federal tax benefits;
- a predictable cost of electricity for the term of the PPA;
- no need to deal with the solar system permitting, design, and construction; and
- no operations and maintenance responsibilities for the array.

Because the NWWTP is adjacent to the airport, a solar array installed at that plant site would need to be designed according to FAA standards and technical guidance. The FAA recognizes the benefits of installing solar power projects at airports and generally supports their implementation. To promote aviation safety, the FAA has studied the visual impacts of solar panels and has issued guidance to address technical considerations.

**Master Plan Updates.** We recommend the City update the WWMP on a regular basis, particularly when changes occur that are likely to have significant impacts on previous recommendations. In general, the City should plan to have a WWMP update prepared every 5 years.

[Section S-1 through S.8.2 under Wastewater System added by Ordinance No. 918, Passed by Council on July 24, 2018.]

Future improvement to the wastewater system are outlined in the following table with a narrative for each phase following.

### FUTURE PROJECT AND TIMING

TIMING	PHASE	PROJECT	PROJECT DEFINED
0-5 years	Phase I	Alternative 'B' Sewer System Improvements	
		'B' Street PS Upgrade	

		Upgrade of Existing NWWTP (Airport)	
		New SWWTP PS at 'B' Street	
		New 0.5 mgd Sequencing	Influent Pump Station SBR units Chlorine Disinfection Aerobic Digestion Sludge Drying Beds
		Off-site Level II Effluent Storage	Effluent Distrib. Pumps 1 mile 6" Effluent FM 0.5 mgd Off-site Storage Lagoon
		Irrigation of privately owned land	
6-10 years	Phase II	Alternative 'B' Sewer System Improvements	
		Upgrade SWWTP PS at 'B' Street	
		Add 0.5 mgd Sequencing Batch Reactor DEQ	Influent Pump Station Upgrade 0.5 mgd SBR units 0.5 mgd Chlorine Disinfection Additional Aerobic Digestion Additional Sludge Drying Beds
		Off-site Level II Effluent Storage	Added Effluent Distrib. Pumps 2 <sup>nd</sup> 1 mi. 6" Effluent Forcemain 2 <sup>nd</sup> 0.5 mgd Off-site Storage Lagoon
		Irrigation of privately owned land	
11-20 years	Phase III		
		Alternative 'B' Sewer System Improvements	
		Upgrade SWWTP PS at 'B' Street	
		Add 0.5 mgd Sequencing Batch Reactor DEQ	Influent Pump Station Upgrade 0.5 mgd SBR units 0.5 mgd Chlorine Disinfection Additional Aerobic Digestion Additional Sludge Drying Beds

		Off-site Level II Effluent Storage	Added Effluent Distrib. Pumps 3 <sup>rd</sup> 1 mi. 6" Effluent Forcemain 3 <sup>rd</sup> 0.5 mgd Off-site Storage Lagoon
		Irrigation of privately owned land	

Information provided in the City of Madras Wastewater System Master Plan, dated November 15, 1996.

The components in the above table were sized for incremental construction of a total of 2.0 mgd wastewater treatment and collection system capacity in 0.5 mgd increments as dictated by the growth.

Alternative 'B' is the wastewater from the southeast area, which will flow by gravity into the new treatment plant. Flows from the rest of the area will be collected into a new or expanded pump station at the existing "B" Street Pump Station. The collected wastewater will then be pumped separately to the North and South treatment plants. The industrial area flows will be pumped into the existing 10-inch forcemain.

Alternative 'B' will require no pump station to be constructed. Flows from the southeast area will be collected by gravity to the South Treatment Plant. The master plan's projected cost for the complete build-out of Phase I, II, and III is \$17,400,000.

- Phase I

North Area Proposed Wastewater Collection System - none noted in the Master Plan for the area labeled as "north area" (figure 5-2A).

Central Area Proposed Wastewater Collection System - North end of Kinkade Road where it turns east into 'A' Street, follow 'A' until you turn north on Juniper Street; Loucks Road going east crossing over Highway 97 onto Jefferson Street, turn north onto 7<sup>th</sup> Street off of Jefferson Street and continue north to Polk Street; Highway 97 turn onto Chestnut Street and go north onto 10<sup>th</sup> Street onto Loucks Road.

South Area Proposed Wastewater Collection System - going north from the Treatment Plant site to Grizzly Lane, continuing past the intersection of Kinkade Road and Grizzly Lane; from where the line begins from the Treatment Plant Site going north, swings west toward McTaggart Road, crossing over the road to the "ponds" continuing south west for approximately 1200 feet and then west for 1600 feet ending at Adams Street.

- Phase II

North Area Proposed Wastewater Collection System - none noted in the Master Plan for the area labeled as "north area" (figure 5-2A).

Central Area Proposed Wastewater Collection System - Starting at Kinkade Road, where it intersects with Grizzly Road, going north to 'E' Street, continuing east on 'E' Street to Claremont Drive and then north on Claremont Drive to Ashwood Road. Starting at the south end of Bean Drive, on Ashwood Road going east for 1200 feet, and then northwest for 1600 feet, north for 2000 feet, and then northwest for 800 feet, which will connect with a line placed during Phase I. Starting at the intersection of Hwy 97 and Cedar Street going southwest to the

intersection of Hwy 26, going south 200 feet, then west for 300 feet, turning south for 500 feet to Pine Street, west on Pine Street for 200 feet and then south for 800 feet to 'B' Street and then west for 700 feet to intersection of 1<sup>st</sup> Street and 'B' Street.

South Area Proposed Wastewater Collection System - starting at the Treatment Plant Site's northeast corner of new line placed during Phase I for 400 feet and then north for 300 feet, turning northwest for 600 feet. Starting at the above 400 feet going east for 600 feet to Grizzly Road and then north for 800 feet.

- Phase III

North Area Proposed Wastewater Collection System - Starting at Adams Drive located between Harris Street and "No Name Road" off of Cherry Lane. This area is approximately 4400 feet in length.

Central Area Proposed Wastewater Collection System - Starts at the west end of 'B' Street where it intersects with 1<sup>st</sup> Street, going south for 1200 feet and then southwest for 800 feet.

South Area Proposed Wastewater Collection System - Starts on Adams Street 300 feet north of S.E. Dimick Lane, continues on S.E. Dimick Lane for 1300 feet, continuing east for approximately 300 feet, going southwest for 300 feet, turning south for 1300 feet. Starting at Treatment Plant Site going southwest for approximately 4200 feet. Running south on Culver Highway where it intersects with Fairgrounds Road, going east for 400 feet, turning south for 400 feet and then southwest for 500 feet.

### C. Stormwater Sewer and Drainage System



- OAR 660-011-0010 (1) (a), (b), (d), (f)

The City of Madras does not have a “Stormwater Sewer and Drainage System Master Plan”. In October, 1991 the City did put together a Storm Drainage Capital Improvement Plan, which has not been updated since. Historically, the City of Madras has required new development to provide on-site systems, including drainage ways, storm sewer detention or other facilities, as dictated by the Oregon Department of Environmental Quality.

Storm water currently runs into the natural drainage course, called Willow Creek, which runs through the city going east to west.

Jefferson County is currently installing on-site “retention ponds” on the property, which houses the courthouse and the annex. There has been no stormwater drainage from the existing parking lot of the courthouse and annex. The County contacted the City to begin their design of a drainage system for the parking lot and was told they did not want any more water going into the existing system, thus the County then contacted DEQ who would not allow dry wells for the storm water, which led to the construction of the settling ponds to handle the storm water runoff.

*Planning Status*

The City intends to prepare a Stormwater Master Plan within the next five (5) years as part of its capital improvement plan (CIP). The Stormwater Master Plan will be used to establish drainage standards that will be adopted into the City’s development code. Until the master plan is adopted and implemented, drainage facilities are being developed case-by-case through the development review process.

The following table shows the proposed projects and their timing. Following the table is a description of location and estimated costs for each project.

TIMING	PROJECT
0-5 years	“I” Street
	“H” Street
	7 <sup>th</sup> Street
	7 <sup>th</sup> and Oak Street
	7 <sup>th</sup> and 8 <sup>th</sup> Streets North
	Henry Street
	Roosevelt Street
	Marshall and “H” Street
	Buff Street West
6-20 years	8 <sup>th</sup> Street

	1 <sup>st</sup> Street
	5 <sup>th</sup> Street
	"J" Street
	6 <sup>th</sup> Street
	2 <sup>nd</sup> Street
	Celilo, Bard and S.E. storm drain
	Fairgrounds Road and Hwy 97S
	Marie, Olive and Fairgrounds West
	10 <sup>th</sup> Street South including Glen Street
	"D" Street
	16 <sup>th</sup> Street and "A" Street
	Hwy 97 North Extension
	Lincoln and Madison
	Buff Street East
	Highway 361 - Ruby to Madison

- "I" Street Storm Drain proposed to be located approximately 350 feet between Wade and Turner Streets for an estimated cost of \$7,150.
- "H" Street is proposed to have a storm drain placed approximately 400 feet between Commerce and Turner Streets for an estimated cost of \$7,210.
- 7<sup>th</sup> Street storm drain is proposed to be located at the intersection of Buff Street for an estimated cost of \$3,072.
- 7<sup>th</sup> and Oak Streets proposed storm drain is at the intersection for an estimated cost of \$10,747.
- 7<sup>th</sup> and 8<sup>th</sup> Streets North between Ebert and Turner Streets for an estimated cost of \$10,080.
- Henry Street storm drain proposed for placement between 8<sup>th</sup> and 10<sup>th</sup> Streets for an estimated cost of \$11,417.
- Roosevelt proposal is placed at the intersection of "G" Street for an estimated cost of \$4,740.
- Marshall and "H" Street storm drain placement at intersection for an estimated cost of \$4,940.
- Buff Street west for an approximate distance of 1100 feet for estimated cost of \$10,880.
- 8<sup>th</sup> Street improvement at the intersection of Buff Street for an estimated cost of \$28,940.

- 1<sup>st</sup> Street storm drain at the intersection of Hwy 97 for an estimated cost of \$28,253.
- 5<sup>th</sup> Street storm drain extension intersects with Buff Street for an estimated cost of \$26,225.
- “J” Street proposal is between 2<sup>nd</sup> and 4<sup>th</sup> Street for approximately 400 feet for an estimated \$11,350.
- 6<sup>th</sup> Street proposal is at the intersection of Buff Street for an estimated \$24,320.
- 2<sup>nd</sup> Street proposal is for an approximate distance of 950 feet south and then extending another 550 feet to Hwy 97 for an estimated \$169,330.
- Celilo, Bard and S.E. proposal for an approximate 1200 feet for an estimated \$62,264.
- Fairgrounds Road and Hwy 97 proposal for an approximate 1400 feet for an estimated \$14,220.
- Marie, Olive and Fairgrounds West proposal for an approximate 400 feet on each street for an estimated \$43,380.
- 10<sup>th</sup> Street south including Glen Street for a distance of 550 feet for an estimated \$64,317.
- “D” Street East for a distance of 850 feet for an estimated \$29,758.
- 16<sup>th</sup> Street and “A” Street for a distance of approximately 300 feet for an estimated \$38,670.
- Hwy 97 north extension for an approximate distance of 1100 feet for an estimated \$12,550.
- Lincoln and Madison proposal for an approximate distance of 525 feet for an estimated \$12,550.
- Buff Street East for an approximate 575 feet for an estimated \$21,365.
- Highway 361 - Ruby to Madison for an approximate distance of 100 feet between the streets for an estimated \$67,352.

#### D. Transportation System

- OAR 660-011-010 (10) (a), (b), (d), (f)

US Highway 97 bisects Madras into east and west sections. Businesses along Hwy 97 have developed over time in an uncontrolled manner with little definition of ingress or egress.

US Highway 26 joins traffic from US Highway 97 just north of Oak Street in Madras. State Highway 361 (the Culver Highway) carries traffic between Madras and the cities of Metolius and Culver. Lake Billy Chinook and Cover State Park also add traffic to the Culver Highway.

There are currently 18 miles of roads under City ownership and control, excluding 4<sup>th</sup> Street. Of these streets, 14 miles are paved, two miles are graded and drained, and less than a mile is unimproved but open for travel. Of the paved streets, 2.7 miles are asphalt concrete and 11.5 miles are surfaced with an oil mat. Nearly all of the streets were built on native material without sufficient base to support heavy truck loading. The streets vary in width from 34 feet to 54 feet.

The majority of the streets in the core area of the City are from 44 feet wide to 54 feet wide. Most streets are curbed; however, most are lacking sidewalks. Right-of-ways in nearly every instance are 16 feet wider than the street. This allows only 8 feet outside the curb for sidewalks and utilities. Consequently, most utilities are buried within the street.

Other transportation facilities are;

- Public Transportation: Dial-a-ride, Greyhound bus line, and taxi service;
- Rail: This service is confined to only providing service to freight trains who service the industrial park north of the city;
- Air: The City of Madras owns and operates a general aviation airport about 5 miles north of town. There is an adopted "Airport Master Plan".
- Pipeline Service: Natural gas pipeline.

### *Planning Status*

Recommendations for improvements to the City's transportation system is addressed in its adopted Transportation System Plan, which was part of its Periodic Review and was acknowledged by DLCD.

- OAR 660-011-0010 (1) (a-g) PROJECT LIST AND CAPITAL IMPROVEMENT PLAN

Additional project lists and capital improvement plans can be found in each of the existing “master plans” discussed in this document. Master plans, which are not existing shall be developed within the next five (5) years, at which time the public facilities plan and comprehensive plan shall be amended to include the “new” information.

- OAR 660-011-0010 (1) (g) FINANCING AND IMPLEMENTATION PLAN

The City of Madras uses a combination of strategies to finance the development and maintenance of its public works infrastructure. The following provides an overview of the financial structure in place to support the Madras’s infrastructure development and ongoing maintenance needs.

*a. Domestic Water System*

The City currently has SDCs in place to charge for new development water lines, hook-ups and meters. SDCs were first adopted into the City’s fee schedule in October, 1991, which included water.

The City has not prepared a “Water Master Plan” for maintenance and repair of the water lines, and meters. A “master plan” for the maintenance and repair of the water lines and meters will be produced and in place within five (5) years.

Deschutes Valley Water District provides water to a number of parcels within the city limits. Their “Master Plan” states that in 1985, the District’s hydro-electric plant was completed near Opal Springs. Since then, revenues from that plant have paid annual principal and interest on two water bonds for a savings of over \$4 million in property taxes. Hydro-electric revenues have also financed approximately \$6 million of our new construction. The District levies no taxes and has no plans to levy taxes in the future, thanks to the hydro-electric revenue.

The District has not had to issue new bonds, water rates have not been raised in nine (9) years, and new service hook-up fees have remained at \$600 since 1985. Studies are being conducted to determine how much water rates and hook-up fees should be raised. This should be accomplished before the large infusion of new customers in the next couple of years. The new pumphouse and new transmission mainline are expensive projects that would not be necessary if the population did not increase. The new customers should bear a reasonable portion of the new development costs.

*b. Wastewater System and Storm Drainage System*

The sanitary sewer and storm drainage systems are part of the City's SDC fees that new development is required to pay upfront at the time of the permitting process. These fees along with revenue bonds, pay for maintenance and repair.

*c. Transportation System*

The City of Madras has a Transportation System Plan (TSP), that includes a 20-year capital improvement plan and financing strategy. Three public entities are responsible for developing and maintaining the transportation system in Madras. They are the State of Oregon, Jefferson County, and the City of Madras. The State is responsible for Hwy 97 and 26, and Jefferson County being responsible for streets/roads within the urban growth boundary.

The City's TSP has documents the funding sources for the City streets. The City of Madras accounts for transportation related revenues and expenditures in three (3) separate funds. Each fund is accounted for separately in the annual fiscal year budget; these funds include the street tax, public facilities plan, and industrial park.

- *State Street Tax Fund*

This fund is to maintain, rehabilitate, improve and expand city street, drainage systems, sidewalks and traffic control devices in an orderly and cost effective program.

- *Public Facilities Plan*

The purpose for this fund is to finance infrastructure construction associated with growth within the community. Revenues for the Public Facilities Plan is generated through a variety of sources including grants, loan proceeds, bond sales, construction warrants, and Local Improvement District (LID) assessments.

- *Industrial Site Fund*

The City of Madras is responsible for the sale and lease of properties at the Madras industrial park. The City maintains control of industrial park leases and sales to actively promote economic activity and diversification. This promotion is done in conjunction with the Economic Development for Jefferson County (EDJ) organization. One of the critical objectives of this fund is to finance public works infrastructure to retain existing businesses and to attract new business to Madras.

- *Debt Financing*

There are a number of debt financing options available to the City. The use of debt to finance capital improvements must be balanced with the City's ability to make future debt service payments and to deal with the impact on its overall debt capacity and underlying credit rating. Its use should be incorporated into the overall financing plan that may include some "pay-as-you-go" funding methods that utilize currently available revenues to meet a portion of the City's transportation needs.

While a wide variety of debt financing techniques exist, some of the primary financing tools used for transportation related projects are general obligation bonds, limited tax general obligation bonds, local improvement district bonds, and special tax revenue bonds. These options and others are discussed more thoroughly in the City's Transportation System Plan (Adopted August 25, 1998).

## **E. PLAN IMPLEMENTATION**

The City of Madras Public Facility Plan is implemented through a combination of local plans, and development codes. Implementing plans include:

- Wastewater System Master Plan, November 15, 1996
- Deschutes Valley Water District, Water System Master Plan, December, 2000
- City of Madras Transportation System Plan, August 25, 1998

Local development codes include:

- Subdivision regulations (City Ordinance No. 522)
- Zoning regulations (City Ordinance 528)

Financing is supported by:

- City of Madras Systems Development Charges
- Annual City budget authorization

Intergovernmental coordination is implemented through:

- Madras/Jefferson County Urban Growth Management Agreement
- Madras/Deschutes Valley Water District Urban Coordination Agreement