Developing a Browser geocoder using REST API and ASP.NET

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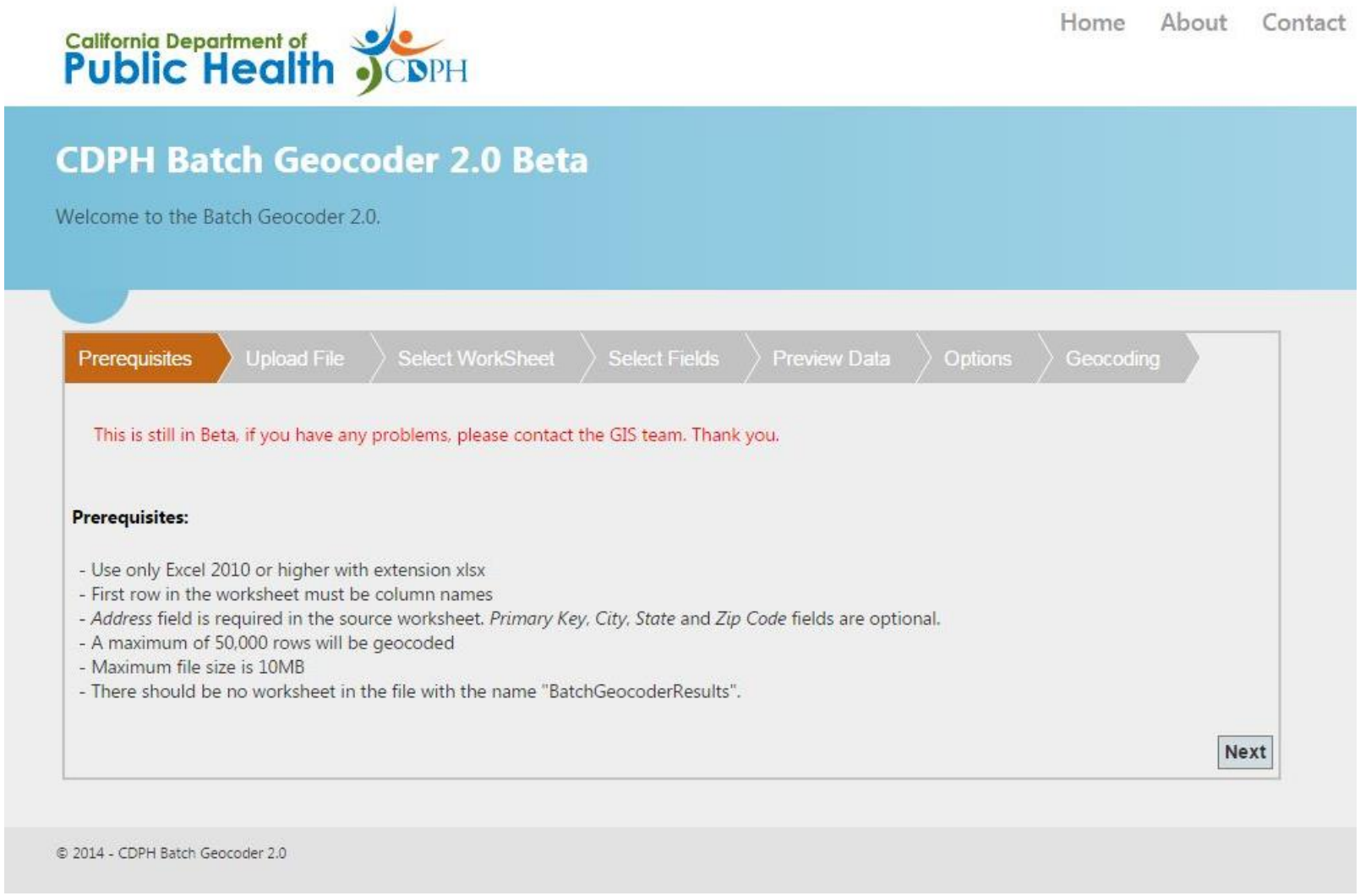
The Browser Geocoder



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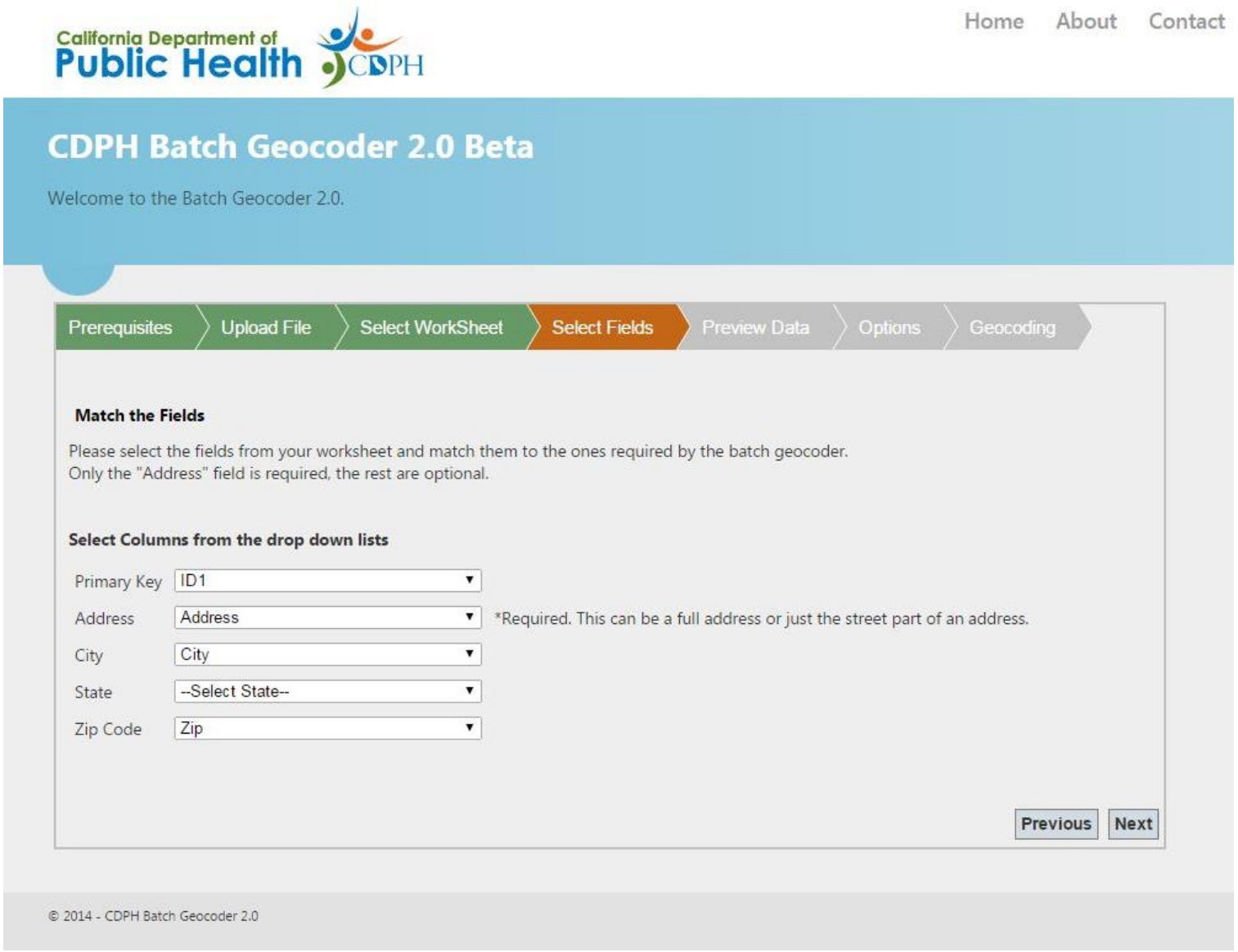

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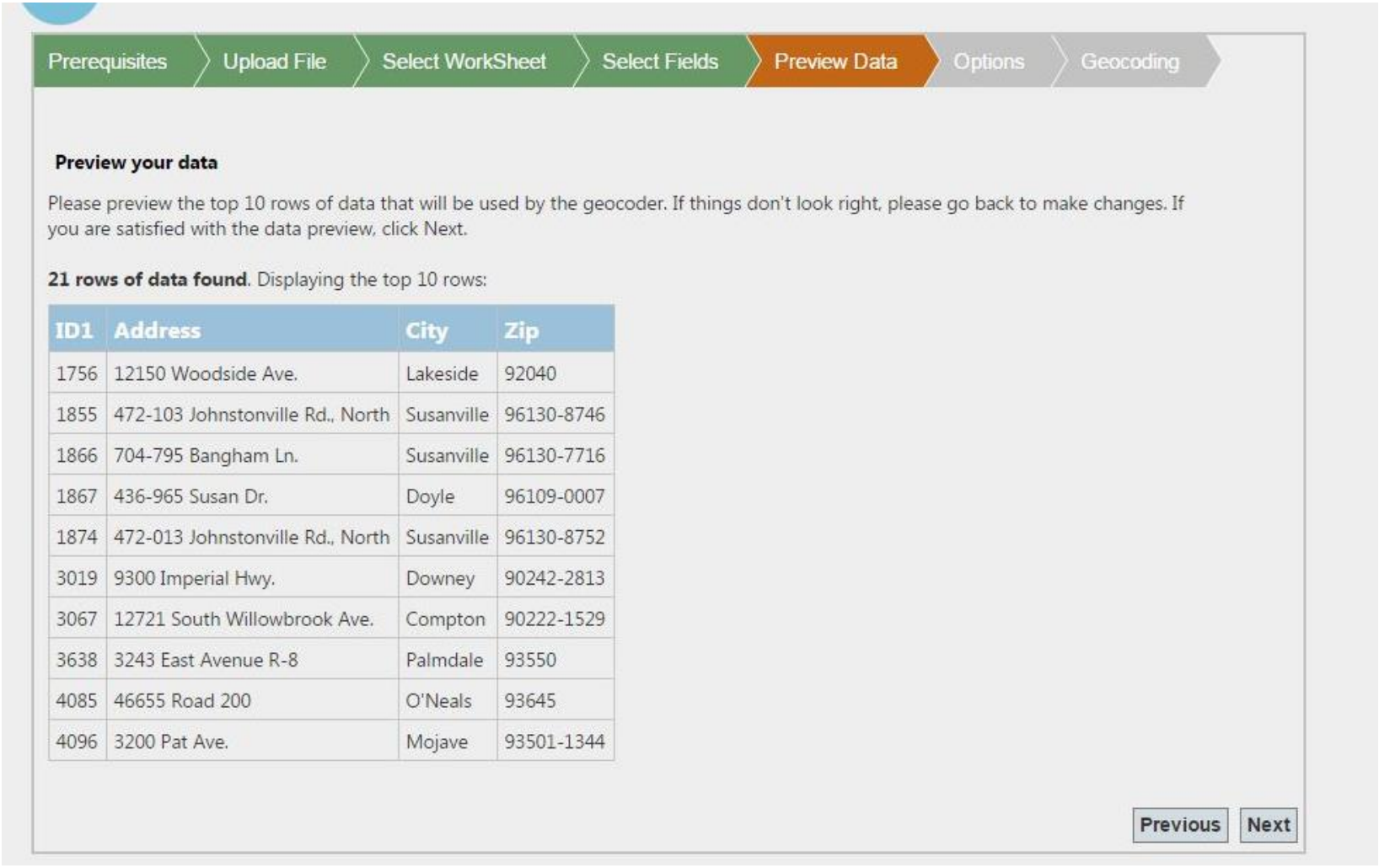

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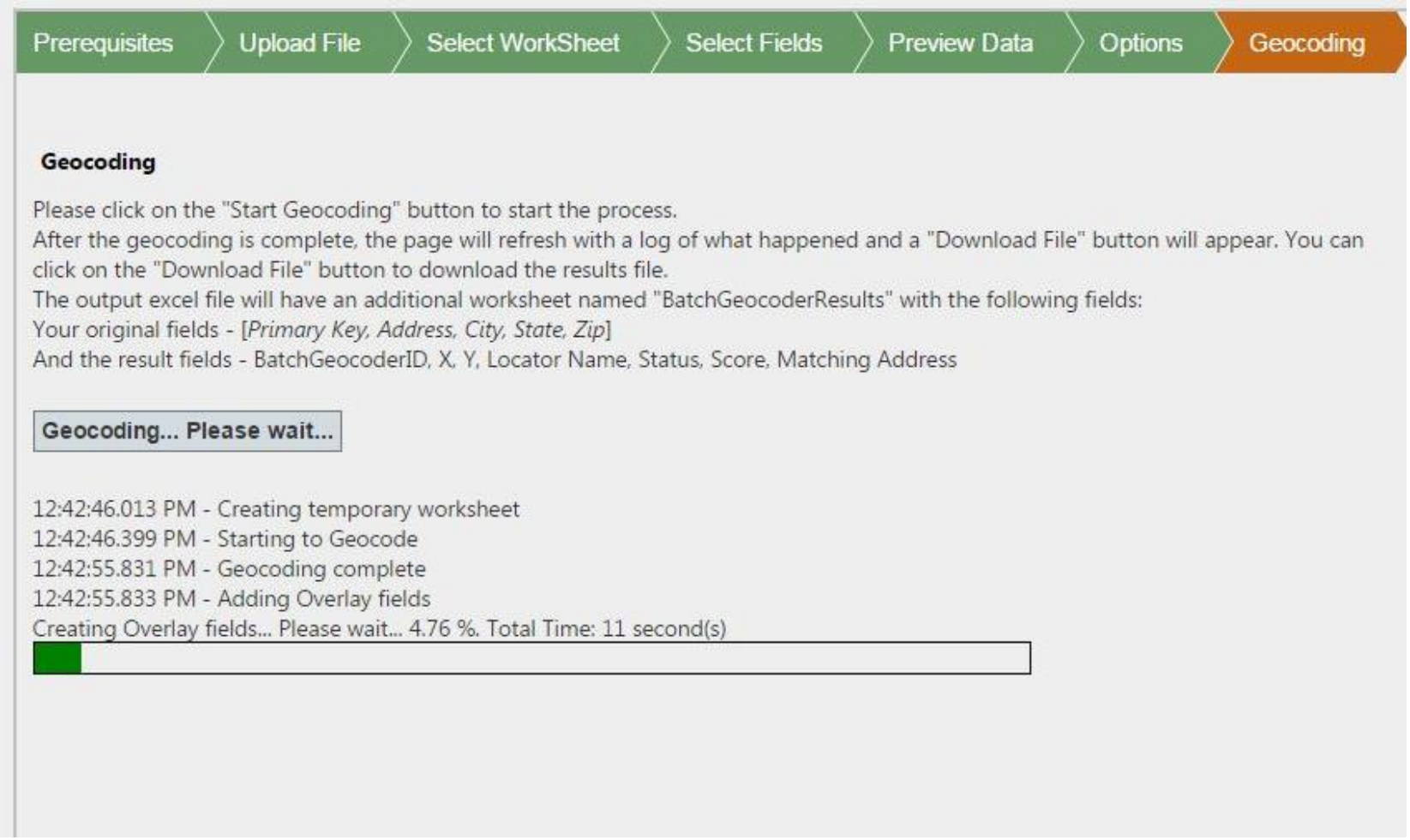

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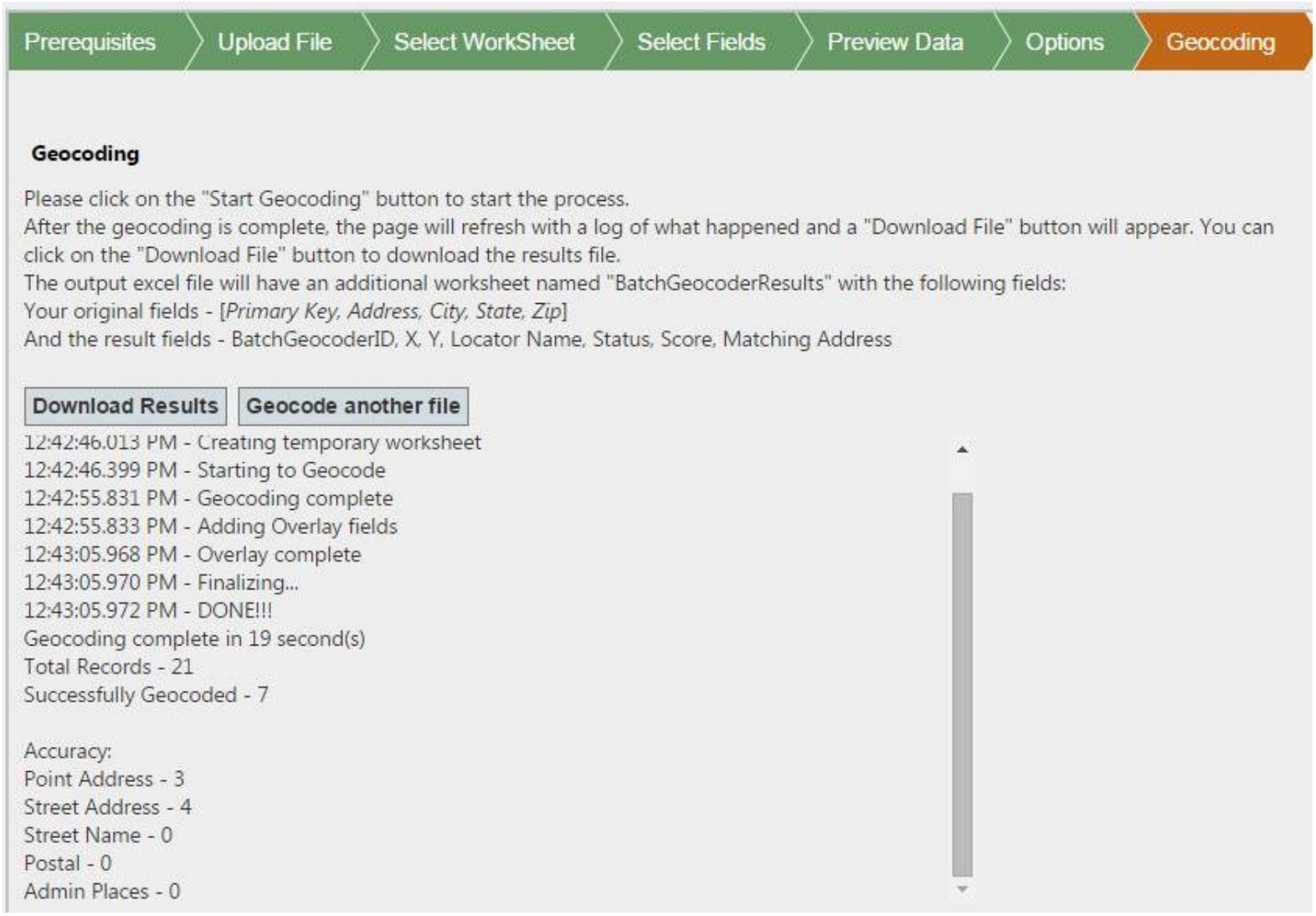
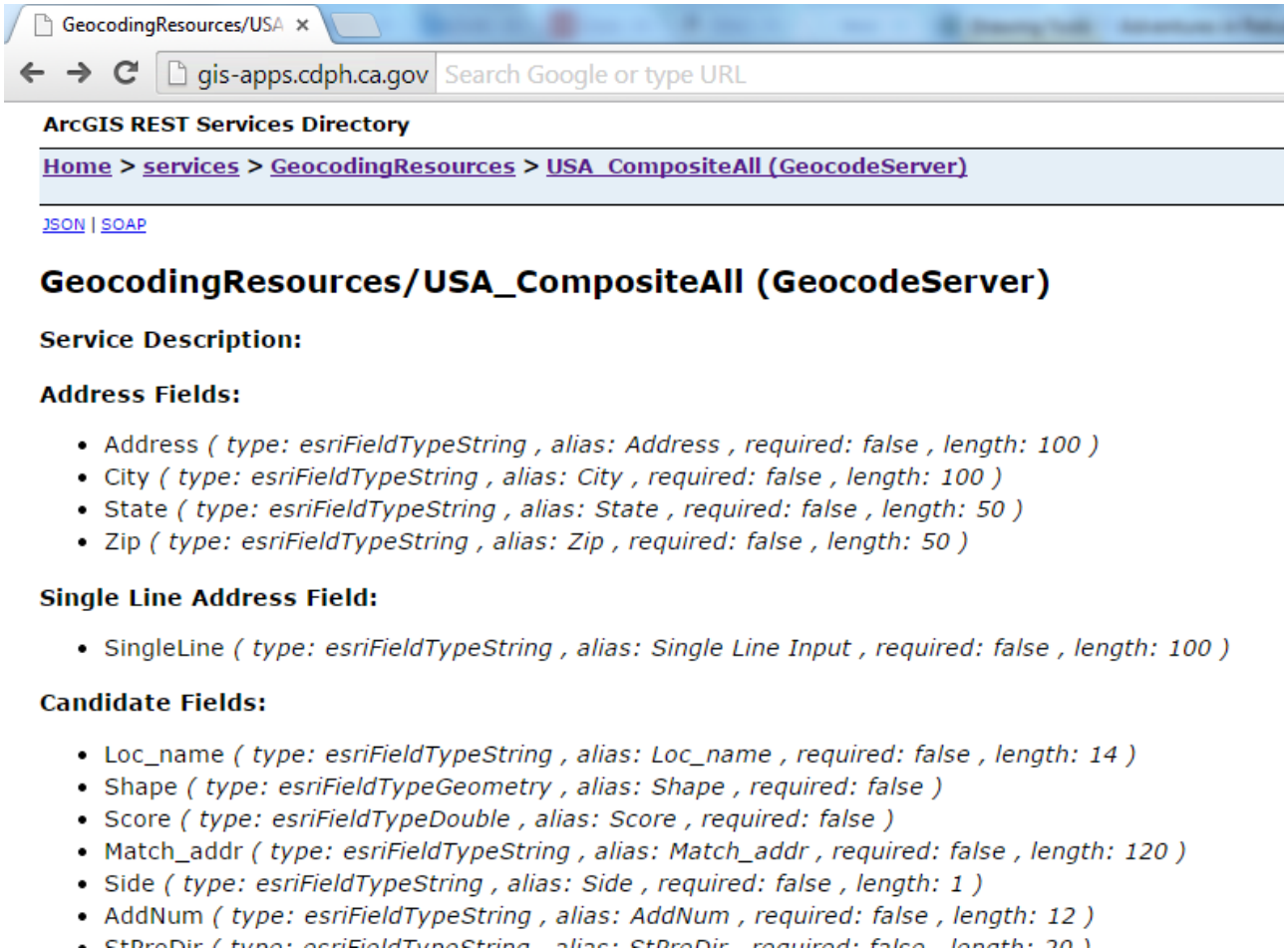
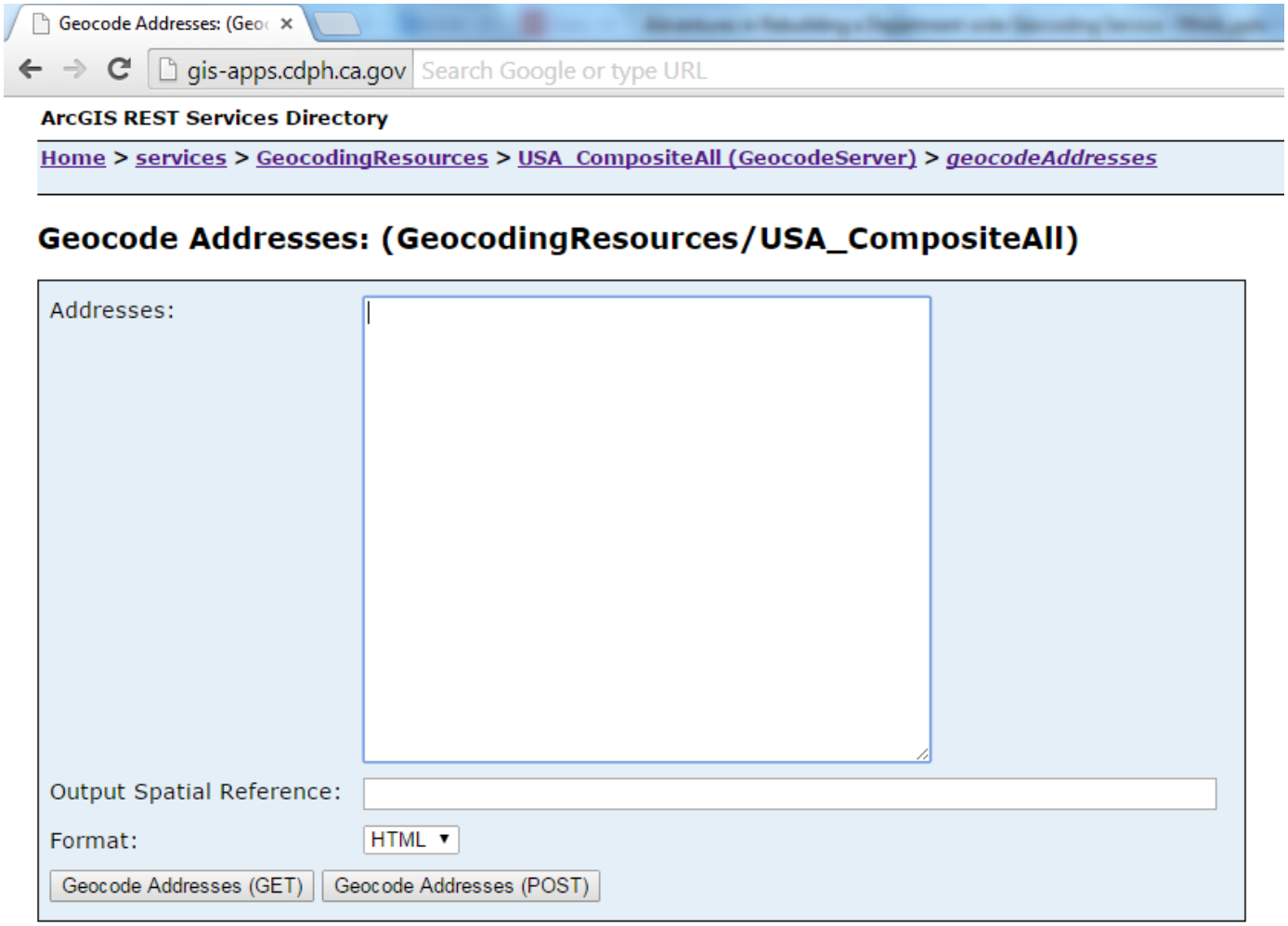


The REST Endpoint



The REST Endpoint



The REST Endpoint - json

```
//Sample JSON for Geocoding
StringBuilder sb = new StringBuilder();
sb.AppendLine(@"{ ""records"": [");
sb.AppendLine(@"   {");
sb.AppendLine(@"     ""attributes"": {");
sb.AppendLine(@"         ""OBJECTID"": 1,");
sb.AppendLine(@"         ""Address"": ""1616 Capitol Ave"",");
sb.AppendLine(@"        ""City"": ""Sacramento"",");
sb.AppendLine(@"        ""State"": ""CA"",");
sb.AppendLine(@"        ""Zip"": ""95814""");
sb.AppendLine(@"     }");
sb.AppendLine(@"   },");
sb.AppendLine(@"   {");
sb.AppendLine(@"     ""attributes"": {");
sb.AppendLine(@"         ""OBJECTID"": 2,");
sb.AppendLine(@"         ""Address"": ""4000 J Street"",");
sb.AppendLine(@"        ""City"": ""Sacramento"",");
sb.AppendLine(@"        ""State"": ""CA""");
sb.AppendLine(@"     }");
sb.AppendLine(@"   }");
sb.AppendLine(@"]");
sb.AppendLine(@"}");
txtGeocoderJSONInput.Text = sb.ToString();
```

The REST Endpoint – request/response

```
//Build Post data
StringBuilder postData = new StringBuilder();
postData.Append("addresses=" + HttpUtility.UrlEncode(txtGeocoderJSONInput.Text) + "&");
postData.Append("outSR=4326&");
postData.Append("f=pjson");

string postDataString = postData.ToString();

//Send the Post request
HttpWebRequest webRequest = (HttpWebRequest)WebRequest.Create(url);
webRequest.Method = "POST";
webRequest.ContentType = "application/x-www-form-urlencoded";
webRequest.ContentLength = postDataString.Length;

using (StreamWriter requestWriter = new StreamWriter(webRequest.GetRequestStream()))
{
    requestWriter.Write(postDataString);
}

//Read the response
string responseData = string.Empty;

using (StreamReader responseReader = new StreamReader(webRequest.GetResponse().GetResponseStream()))
{
    responseData = responseReader.ReadToEnd();
}
```

The REST Endpoint - Output

Input JSON for Geocoding:


```
{ "records": [
   {
     "attributes": {
         "OBJECTID": 1,
         "Address": "1616 Capitol Ave",
        "City": "Sacramento",
        "State": "CA",
        "Zip": "95814"
     }
   },
   {
     "attributes": {
         "OBJECTID": 2,
         "Address": "4000 J Street",
        "City": "Sacramento",
        "State": "CA"
     }
   }
]
}
```


Submit to Geocoding Service

Output JSON from Geocoder:


```
{
 "spatialReference": {
  "wkid": 4326,
  "latestWkid": 4326
 },
 "locations": [
  {
   "address": "1616 Capitol Ave, Sacramento, Cal
   "location": {
    "x": -121.48594163399849,
    "y": 38.574701897575608
   },
   "score": 100,
   "attributes": {
    "ResultID": 1,
    "Loc_name": "PointAddress",
    "Status": "M",
    "Score": 100,
    "Match_addr": "1616 Capitol Ave, Sacramento,
    "Side": "R",
```

DEMO

Reading Excel Spreadsheets

```
oledbConn = new OleDbConnection(@"Provider=Microsoft.ACE.OLEDB.12.0; Data Source=" +
    hdnUploadedFileNameWithPath.Value + "; Extended Properties='Excel 12.0;HDR=YES;IMEX=1;';");
oledbConn.Open();

DataTable dt = oledbConn.GetOleDbSchemaTable(System.Data.OleDb.OleDbSchemaGuid.Tables, null);
bool bOutputSheetFound = false;
for (int i = 0; i < dt.Rows.Count; i++)
{
    string sTemp = dt.Rows[i]["TABLE_NAME"].ToString();
    if (sTemp == "BatchGeocoderResults")
        bOutputSheetFound = true;
}

if (bOutputSheetFound)
{
    UploadStatusLabel.Text = "You cannot have any worksheets with the name \"BatchGeocoderResult
    UploadStatusLabel.ForeColor = System.Drawing.Color.Red;
    oledbConn.Close();
    return;
}

ddlWorksheets.Items.Clear();

ddlWorksheets.DataSource = dt.DefaultView;
ddlWorksheets.DataTextField = "TABLE_NAME";
ddlWorksheets.DataValueField = "TABLE_NAME";
ddlWorksheets.DataBind();
ListItem li = new ListItem("--Select Worksheet--", "-1");
ddlWorksheets.Items.Insert(0, li);
```

Read columns and preview data

```
oledbConn.Open();

OleDbCommand cmd = new OleDbCommand(); ;
OleDbDataAdapter oleda = new OleDbDataAdapter();
DataSet ds = new DataSet();

cmd.Connection = oledbConn;
cmd.CommandType = CommandType.Text;
cmd.CommandText = "SELECT top 1 * FROM [" + ddlWorksheets.SelectedValue + "]";
oleda = new OleDbDataAdapter(cmd);
oleda.Fill(ds, "dsSlno");
```

```
sCommandText = "";
sCommandText = "SELECT top 10 ";
if (bIDColumn) sCommandText += "[" + ddlObjectID.SelectedValue + "], ";
sCommandText += "[" + ddlAddress.SelectedValue + "]";
if (bCityColumn) sCommandText += ", [" + ddlCity.SelectedValue + "]";
if (bStateColumn) sCommandText += ", [" + ddlState.SelectedValue + "]";
if (bZipColumn) sCommandText += ", [" + ddlZip.SelectedValue + "]";
sCommandText += " FROM [" + ddlWorksheets.SelectedValue + "]";
```

Define fields in Output Sheet

```
string sCommand = "Create table [BatchGeocoderResults] ";
sCommand += " (BatchGeocoderID number,";
if (ddlObjectID.SelectedValue != "-1")
    sCommand += " [" + ddlObjectID.SelectedValue + "] string,";

sCommand += " [" + ddlAddress.SelectedValue + "] string,";

if (ddlCity.SelectedValue != "-1")
    sCommand += " [" + ddlCity.SelectedValue + "] string,";
if (ddlState.SelectedValue != "-1")
    sCommand += " [" + ddlState.SelectedValue + "] string,";
if (ddlZip.SelectedValue != "-1")
    sCommand += " [" + ddlZip.SelectedValue + "] string,";
sCommand += " X number, Y number, [Locator Name] string, Status string, Score number,
for (int j = 0; j < selectedLI.Count; j++)
{
    sCommand += ",[" + selectedLI[j].Text + "] string";
}
```

Start Geocoding

```
AddToGeocodingLog("\n" + DateTime.Now.ToString("hh:mm:ss.fff tt") + " - Starting to Geocode");
```

```
sqlCmd.CommandType = CommandType.StoredProcedure;
sqlCmd.CommandText = "UpdateGeocodingLog";
sqlCmd.Parameters.Add("BatchID", SqlDbType.Int).Value = Convert.ToInt32(hdnBatchGeocoderID.Value);
sqlCmd.Parameters.Add("StringToAdd", SqlDbType.VarChar, 1000).Value = sStringToAdd;
```

```
    if (iTotalNumberOfRecords < 1000)
        iNumberOfRecordsToGeocodeAtOnce = 50;
    else if (iTotalNumberOfRecords < 5000)
        iNumberOfRecordsToGeocodeAtOnce = 100;
    else if (iTotalNumberOfRecords < 20000)
        iNumberOfRecordsToGeocodeAtOnce = 200;
```

Request/Response

```
// create the POST request
HttpWebRequest webRequest = (HttpWebRequest)WebRequest.Create(url);
webRequest.Method = "POST";
webRequest.ContentType = "application/x-www-form-urlencoded";
webRequest.ContentLength = postDataString.Length;

using (StreamWriter requestWriter2 = new StreamWriter(webRequest.GetRequestStream()))
{
    requestWriter2.Write(postDataString);
}

//  This actually does the request and gets the response back
HttpWebResponse resp = (HttpWebResponse)webRequest.GetResponse();

string responseData = string.Empty;

using (StreamReader responseReader = new StreamReader(webRequest.GetResponse().GetResponseStream()))
{
    // dumps the HTML from the response into a string variable
    responseData = responseReader.ReadToEnd();
}

dynamic outputObject = JsonConvert.DeserializeObject(responseData);

UpdateResultsSheet(outputObject);
```

Parsing the Response Object

```
for (int i = 0; i < outputObject.locations.Count; i++)
{

    cmd = new OleDbCommand();
    cmd.Connection = oledbConn;
    cmd.CommandType = CommandType.Text;
    cmd.CommandText = @"UPDATE [BatchGeocoderResults] SET"
        + " X = " + outputObject.locations[i].location.x + ", "
        + " Y = " + outputObject.locations[i].location.y + ", "
        + " [Locator Name] = '" + outputObject.locations[i].attributes.Loc_name + "', "
        + " Status = '" + outputObject.locations[i].attributes.Status + "', "
        + " Score = " + outputObject.locations[i].attributes.Score + ", "
        + " [Matching Address] = '" + outputObject.locations[i].attributes.Match_addr + "' "
        + " WHERE BatchGeocoderID = " + outputObject.locations[i].attributes.ResultID + "";
    cmd.ExecuteNonQuery();

    iSuccessfullyGeocoded++;
```

Add Overlay Output

```
using (StreamReader responseReader = new StreamReader(webRequestOverlay.GetResponse().GetResponseStream()
{
    // dumps the HTML from the response into a string variable
    responseDataOverlay = responseReader.ReadToEnd();
}
outputOverlayObject = JsonConvert.DeserializeObject(responseDataOverlay);

UpdateResultsSheetWithOverlayData(outputOverlayObject);


for (int i = 0; i < outputObject.results[0].value.features.Count; i++)
{
    string sSelectedOptions = "";
    for (int j = 0; j < selectedLI.Count; j++)
    {
        if (sSelectedOptions != "")
            sSelectedOptions += ",";
        string sTemp = outputObject.results[0].value.features[i].attributes[selectedLI[j].Value];
        sSelectedOptions += " [" + selectedLI[j].Text + "] = '" + sTemp.Replace("'", "''") + "' ";
    }

    cmd = new OleDbCommand();
    cmd.Connection = oledbConn;
    cmd.CommandType = CommandType.Text;
    cmd.CommandText = @"UPDATE [BatchGeocoderResults] SET"
                            + sSelectedOptions
                        + " WHERE BatchGeocoderID = " + outputObject.results[0].value.features[i].attributes.
    cmd.ExecuteNonQuery();

}
```

Final Output

D	E	F	G	H	I	J	K	L
City	Zip	X	Y	Locator Name	Status	Score	Matching Address	Census 2010 Tracts
ıkeside	92040	-116.9302927	32.85619511	USA_PointAddress	M	100	0 Woodside Ave, Lakeside, California, 9	06073016702
sanville	96130-8746	0	0			0		
sanville	96130-7716	0	0			0		
Doyle	96109-0007	0	0			0		
sanville	96130-8752	0	0			0		
owney	90242-2813	-118.1286025	33.9169532	USA_PointAddress	M	100	0 Imperial Hwy, Downey, California, 90	06037551800
ompton	90222-1529	-118.2322575	33.91725951	USA_StreetAddress	M	100	Willowbrook Ave, Compton, California	06037541400
ılmdale	93550	-118.0708835	34.56560323	USA_StreetAddress	M	100	3 E Avenue R 8, Palmdale, California, 93	06037910605
'Neals	93645	0	0			0		
Mojave	93501-1344	-118.1897983	35.05005902	USA_StreetAddress	M	100	3200 Pat Ave, Mojave, California, 93501	06029005900
roville	95965	0	0			0		
'Neals	93645	0	0			0		
mecula	92592	-117.0952345	33.49804217	USA_StreetAddress	M	100	Meadows Pkwy, Temecula, California,	06065043264
ockton	95207	0	0			0		
ockton	95215-9113	0	0			0		
Palo Alto	94303	0	0			0		
ıgton Beach	92647	-118.0127373	33.73405412	USA_PointAddress	M	100	Glen Dr, Huntington Beach, California, 9	06059099605
taluma	94954-2301	0	0			0		
ıta Rosa	95401-4035	0	0			0		
akdale	95361	0	0			0		
oveland	95321-9338	0	0			0		

Future Enhancements

- Run as a Windows service
- Publish as an asynchronous service
- Publish and consume other services on the REST endpoint

```
protected void End_Of_Presentation()
{
    Console.Write("Any Questions");
}
```

Contact

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- Bhavdeep.Sachdev@gmail.com

- Get the code:
- https://github.com/bhavdeep-sachdev/CDPHBrowserGeocoder