(U) Urban Search and Rescue Atlas

(U) Special note: The Atlas is classified “UNCLASSIFIED//FOR OFFICIAL USE ONLY”

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(U) Prepared by: NGA Office of Americas/North America and Homeland Security Division (PMH)
The National Geospatial-Intelligence Agency (NGA) is a Department of Defense combat support agency and a member of the national Intelligence Community (IC). Headquartered in Bethesda, Md., NGA has major facilities in the Washington, D.C., and St. Louis, Mo., areas. NGA also supports mission partners through NGA representatives stationed around the world.

**NGA Mission**

NGA provides timely, relevant and accurate geospatial intelligence (GEOINT) in support of national security.

**GEOINT**

GEOINT is in formation about any object that can be located on the Earth. The term “geospatial intelligence” mean using imagery and geospatial (mapping, charting and geodesy) information to describe, assess and visually depict features and geographically referenced activities on the Earth.

The fusion of imagery, geospatial data, imagery intelligence and analysis is GEOINT. NGA takes a picture of an area, layers it wit terrain information, and analyzes the situational context. GEOINT tells us where something is, what it is and why it is important. Tailored to the customer’s mission and geographic location, GEOINT can be as simple as a satellite image or as complex as a geographic information system database merged with other forms of intelligence.

GEOINT is at the center of intelligence activities, establishing that everything and everyone has to be somewhere.

**What NGA Does**

NGA develops imagery and map-based intelligence solutions for U.S. national defense, homeland security and safety of navigation. NGA is the IC’s and the Department of Defense’s principal producer and provider of GEOINT.

During the 20th century, NGA led collaboration about GEOINT among mission partners. In the 21st century, NGA is developing more efficient ways to exchange information and broaden access to all GEOINT sources and data throughout the IC.

**Securing the Nation**

From the White House to combat locations on the front lines, NGA helps save lives. As a Department of Defense combat support agency, NGA serves policymakers, decisionmakers and warfighters, while NGA’s experts help these partners effectively apply GEOINT to their work protecting the United States.

**Combat and Humanitarian Support**

NGA provides the warfighter with precise, timely GEOINT data, information and products, from nautical charts and flight publications to target positions and satellite imagery.

In addition to supporting combat operations, NGA supports disaster relief and homeland defense by providing the lead federal agencies and first responders with GEOINT, including satellite imagery of flooded areas and maps showing damage to transportation net works and threatened populated areas.

**National System for Geospatial Intelligence**

The National System for Geospatial Intelligence (NSG) is a unified community of GEOINT experts, producers and users working as a team to integrate technology, policies, capabilities, standards and doctrine to produce GEOINT in a “multi-intelligence (multi-INT)” environment in which many sources of intelligence are combined and used to solve national problems.

As the Functional Manger for the NGS, NGA provides strategic thinking, guidance, and direction to the IC concerning all aspects of GEOINT. NGA collaborates with NSG partners to ensure that GEOINT is a part of decision making and operations where and when it’s needed.

**The Future**

NGA is developing new partnerships and expanding existing partnerships in order to maximize the return on the collective investment from all GEOINT partners. NGA also continues to advance toward a data centric digital environment in which mission partners will have ready access to GEOINT databases through interoperable systems.
Military Map Reading 201

This information paper is designed to resolve the confusion between the Universal Transverse Mercator (UTM) and the Military Grid Reference System (MGRS) coordinates. The two systems are often used interchangeably, but they are not the same. Most of our allies, intelligence databases, and many software packages use the UTM system. The Army and Marine Corps proposed the MGRS convention to simplify coordinate exchange for the soldier/marine in the field. The aim of this paper is for users to understand both the UTM and MGRS systems and be able pull coordinates on multiple scales of maps and charts.

Universal Transverse Mercator Grid

The UTM projection transforms our three-dimensional world into a two dimensional system that allows cartographers and map users to measure distances, angles, and areas accurately. The UTM system divides the world into 60 numbered (1-60) zones with each zone being 6° wide in longitude. The 60 zones begin counting at 1 from the International Date Line, at 180° West longitude (located between Alaska and Russia), to 30 at the Prime Meridian (Greenwich, England), and up to 60 back to the International Date Line. The UTM projection loses the qualities of distortion prevention once we go near the north and south poles. For this reason UTM is valid for areas on the earth from 84° N to 80° S. The polar regions, areas between 84° N to 90° N and 80° S to 90° S, are portrayed on maps and charts using the Universal Polar Stereographic (UPS) projection. The UPS projection is used to avoid the convergence of the longitudinal lines outside of the designated area of the UTM projection.

Grid Zone Designations of the UTM Coordinate Systems

UTM coordinates for a location are determined in a multi-step process. First the user must find the proper UTM zone in which the position is located. The UTM zone number is located in the margin of large-scale maps (TLM, JOG), and in the printed area on medium scale (TPC/ONC) aeronautical charts. Next the user should designate whether the location is in the Northern or Southern Hemisphere. This is an important point because a UTM coordinate can work in both the Northern and Southern Hemispheres. Next, the position is specified within the zone using a X, Y or Easting and Northing grid system. UTM Coordinates are always read right and up resulting in Easting and Northing values in meters. The Easting is always a six digit value while the Northing figure is almost always a seven digit value (near the equator there may be less than seven, but most systems will want you to precede a six digit coordinate with a zero). In the Northern Hemisphere Northing values are determined by counting the number of meters that the location lies north of the equator. For areas in the southern hemisphere the Northing values start at 10,000,000 meters North at the equator and count down. For example a location 1 meter south of the...
equator would have a Northing value of 9,999,999 meters North, while a position 1 meter north of the equator would have a Northing value of 0,000,001 meters North.

Below we have depicted an example of a UTM coordinate. To read the Easting value you need to look at the bottom left corner of the map’s image area to find the UTM string. The Easting string will generally have one small number (in size), one large number (JOG, TPC, ONC) or two (TLM), then three or four small zeros (six total digits – e.g. 5450000mE). As you can see, the large numbers are the ones that change as you look across the bottom of the map sheet. They correspond to the 1,000 or 10,000 meter squares within a 6 longitudinal belt that fits the Army’s Coordinate Scale and Protractor (See following details to obtain coordinate from the protractor). Read over (right) to the furthest grid line without passing the point. This should give you the first two or three numbers depending on scale. To fill in the last three or four digits of the Easting value, you use the protractor overlaid on the appropriate square.

To determine the Northing value you follow a similar process, except that you are now using the numbers associated with the horizontal grid lines. In this example the grid intersection is 4151000mN meters north of the equator. Remember that UTM coordinates require you to use all six digits in the Easting and all seven in the Northing values. Generally, this results in the last one or two digits always being zero because you can not read a protractor any more accurately than one millimeter. For example, the UTM coordinate for the grid line intersection encircled above is 15 545,000mE 4,151,000mN

Military Grid Reference System (MGRS)

The MGRS system was designed to simplify the specification of position and passing of coordinates for soldiers and marines. The MGRS system allows users to abbreviate the 13-digit UTM coordinate, making it easier to use. You begin the same way, with the Grid Zone Designator, but there it is different. The difference is that the 60 zones are divided every 8 of latitude, which forms 6 x 8 grid zones. The one exception to the 8 latitudinal division is the northern most division “X” which is 12 high. The 8 divisions are denoted by a lettering scheme that starts with “C” at 80 S and letters each 8 latitude zone to “X” excluding the letters I and O which are easily confused with 1 and 0. The basic system is depicted below:

Grid Zone Designations of the MGRS Coordinate Systems
Next, each 6 x 8 grid zone is further broken down into 100,000 meter squares. Each 100,000 meter square is assigned a two letter scheme to distinguish it from the neighboring squares. The first letter starts with A in the west and goes higher as the zones move east. This letter corresponds to the first digit in the Easting value of a UTM coordinate. The second letter starts with A in the south and rises as you move north. The second letter in the 100,000 meter square identifier corresponds to the second digit in the Northing value of the UTM coordinate. These two letters allow you to remove the small numbers preceding the large ones from the full UTM coordinate in the bottom left corner of the map face. In the example from the previous page, \textsuperscript{5}45000mE and \textsuperscript{41}51000mE, the superscript 5 and 41 are no longer required in MGRS because the letters are used in their place to denote 6 X 8 grid zone and 100,000m square.

To specify a location in the MGRS system you must first determine which 6 x 8 grid zone the point is lies in. Grid zone designator information is normally found in the margin of large scale maps as depicted in the figure above (15S). Next, you need to identify the 100,000 meter square identifier for the point’s location. Once again look to your margin for TLMs and JOGs to specify the letter combination (WM).

Now the process is similar to the UTM system in that coordinates are read right and up. The key difference is that the number of easting digits must equal the number of northing digits. First you must
read the Easting value, start the numerical part of your MGRS coordinate with the large number(s) that run along the bottom and side of the map and then use the protractor to obtain more precision. Unlike UTM, you do not have to use every number that would result from a “full” coordinate (10 digits -- five in the Easting and five in the Northing). You can simplify it with six digit (leave off last two digits in each direction) or eight digit (one in both E and N) coordinates.

An often-confusing point is that most NIMA 1:50,000 scale maps are made to an accuracy of 50m at the 90% confidence interval. This means that 90% of all well-defined points on a map will fall within a 50 meter radius of their actual position on the earth’s surface. The confusion comes in when soldiers try to use a map to get a 10-digit grid coordinate, which equates to a 1 meter precision. A 1:50,000 scale map is only accurate to 50m 90% of the time so a 6 digit (100m precision) or an 8 digit (10m precision) are more appropriate. A 1:250,000 scale map maintains an accuracy of 250 meters at the 90% confidence interval.

**MGRS-Old and MGRS-New**

Inventors and users, cartographers, of MGRS have changed several times over the years. With the advent of a modern global datum, WGS-84, the inventors of MGRS decided to modify the existing MGRS 100,000 meter square identifier lettering scheme. To make it obvious to the military map user, DMA instituted a ten-letter shift in the second (northing) letter of the new MGRS 100,000 meter square identifiers. For an area mapped with an old datum (e.g. NAD-27) the 100,000 meter square identifier would be **UT**. The MGRS 100,000m square identifier scheme for the same area changes to **UH** as it’s when mapped using WGS-84 datum. This ten-letter shift in the identifier was designed to alert the user to the problem with old and new maps as well as datum incompatibilities.

The MGRS Old system was based on three local ellipsoids (Bessel, Clarke 1866, and Clarke 1880) that predominantly were used with North American Datum 1927, Tokyo Datum, and many African datums. The New system is based on eight ellipsoids (Grid Reference System 1980, International, World Geodetic System 1984, WGS72, Australian, Everest, South American 1969 (GRS67), and Clarke 1866 (UTM Zones 47-50)) and is used for all global datums and many regional datums like ED50.

*The most important note that can be taken from this information paper is that two users at each end of a communication must be using the same coordinate system, grid zone designator and datum/ellipsoid pair. This issue can be rectified by each user verifying the data in the margin to ensure that everyone is using the same system*

**Coordinate Scale and Protractor**

This Department of the Army Training Aid (GTA 5-2-12, 1981) assists you in determining your position within a 1,000 or 10,000 meter square. You begin by aligning the base of the triangle (zero tick mark on the right side) with the UTM grid line below your point of interest (see grid line 84 of example). Align the right side so that it intersects the point as in the example. Read the coordinate right, then up. In the easting you have (1482). In the northing, you have 8407. The full eight-digit MGRS coordinate in this example is **18S UH 1482 8407**.

(18S UH comes from the marginal data.)
### Astronomical Twilight

Astronomical Twilight is defined as the time when the sun is 12° to 18° below the horizon. The sky is almost totally dark. In ideal conditions, all but the dimmest stars are visible.

### Civil Twilight

Civil Twilight is defined as the time when the sun is 6° to 12° below the horizon. Objects can be distinguished, but additional light is generally needed to read outside.

### Nautical Twilight

Nautical Twilight is defined as the time when the sun is 6° to 12° below the horizon. Objects are difficult to make out. This is often referred to as "first light" and "nightfall."

### Astronomical Twilight

Astronomical Twilight is defined as the time when the sun is 12° to 18° below the horizon. The sky is almost totally dark. In ideal conditions, all but the dimmest stars are visible.

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**Table: Sendai, Japan**

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<th>Date</th>
<th>Astronomical Twilight Begins</th>
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<th>Civil Twilight Begins</th>
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**Daylight Saving Time**

Daylight Saving Time is not observed in this location.

Civil Twilight is defined as the time when the sun is 6° or less below the horizon. Objects can be distinguished, but additional light is generally needed to read outside.

Nautical Twilight is defined as the time when the sun is 6° to 12° below the horizon. Objects are difficult to make out. This is often referred to as "first light" and "nightfall."

Astronomical Twilight is defined as the time when the sun is 12° to 18° below the horizon. The sky is almost totally dark. In ideal conditions, all but the dimmest stars are visible.
**Sunrise, Sunset, and Twilight Information: May–August**

**Sendai, Japan**

38° 18' 00" N  140° 54' 00" E

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<td>12</td>
<td>0:00</td>
<td>0:00</td>
<td>0:20</td>
<td>13 hrs, 45 min</td>
<td>19:01</td>
<td>20:39</td>
<td>10 hrs, 20 min</td>
<td></td>
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</tr>
<tr>
<td>July</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1</td>
<td>2:53</td>
<td>3:32</td>
<td>4:08</td>
<td>14 hrs, 9 min</td>
<td>18:47</td>
<td>19:16</td>
<td>10 hrs, 59 min</td>
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</tr>
<tr>
<td>2</td>
<td>2:28</td>
<td>2:59</td>
<td>3:24</td>
<td>14 hrs, 6 min</td>
<td>18:45</td>
<td>19:14</td>
<td>10 hrs, 39 min</td>
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<tr>
<td>3</td>
<td>2:03</td>
<td>2:34</td>
<td>3:00</td>
<td>14 hrs, 3 min</td>
<td>18:43</td>
<td>19:12</td>
<td>10 hrs, 19 min</td>
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<tr>
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<td>1:59</td>
<td>2:46</td>
<td>13 hrs, 57 min</td>
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<td>1:34</td>
<td>2:30</td>
<td>13 hrs, 50 min</td>
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<td>13 hrs, 43 min</td>
<td>18:37</td>
<td>19:05</td>
<td>9 hrs, 41 min</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>7</td>
<td>0:43</td>
<td>0:23</td>
<td>2:00</td>
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<td>9 hrs, 35 min</td>
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<td>13 hrs, 29 min</td>
<td>18:33</td>
<td>19:01</td>
<td>9 hrs, 29 min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>0:13</td>
<td>0:02</td>
<td>1:30</td>
<td>13 hrs, 22 min</td>
<td>18:30</td>
<td>18:59</td>
<td>9 hrs, 23 min</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>10</td>
<td>0:00</td>
<td>0:00</td>
<td>1:15</td>
<td>13 hrs, 15 min</td>
<td>18:28</td>
<td>18:57</td>
<td>9 hrs, 17 min</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Daylight Saving Time is not observed in this location.

Civil Twilight is defined as the time when the sun is 6° or less below the horizon. Objects can be distinguished, but additional light is generally needed to read outside.

Nautical Twilight is defined as the time when the sun is 12° below the horizon. Objects are difficult to make out. This is often referred to as "first light" and "nightfall.

Astronomical Twilight is defined as the time when the sun is 12° to 18° below the horizon. The sky is almost totally dark. In ideal conditions, all but the dimmest stars are visible.
<table>
<thead>
<tr>
<th>October</th>
<th></th>
<th>September</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Date</strong></td>
<td><strong>Astronomical Twilight Begins</strong></td>
<td><strong>Astronomical Twilight Begins</strong></td>
</tr>
<tr>
<td>1</td>
<td>05:30</td>
<td>05:26</td>
</tr>
<tr>
<td>2</td>
<td>05:29</td>
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</tr>
<tr>
<td>31</td>
<td>04:57</td>
<td>04:57</td>
</tr>
</tbody>
</table>

Daylight Saving Time is not observed in this location.

Astronomical twilight has been considered in these calculations, using the generally accepted value of 0° 34′ for the effect of refraction at the horizon.
SENDAI, JAPAN

1K GRID CELL: 54SVH8341
10K MAP SERIES: 54SVH84

1:6,000 Scale

World Geodetic System 1984 Datum

Grid Zone Designation: 54S

100,000-m Square Identification: VH

Map / Vector Data Source: Map data ©OSM CC-BY-SA (Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

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For information and planning purposes only.

Search Grid
Hospital
Police
School

SENDAI, JAPAN

INDEX MAP

MAPSHEET 7 of 400

UNCLASSIFIED//FOUO
1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: S4S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
(Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

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SENDAI, JAPAN
1K GRID CELL: 54SVH8537
10K MAP SERIES: 54SVH83

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S

100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
(Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

Search Grid
Hospital
Police
School

SENDAI, JAPAN
INDEX MAP

UNCLASSIFIED//FOUO
SENDAI, JAPAN
1K GRID CELL: 54SVH8633
10K MAP SERIES: 54SVH83

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
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INDEX MAP

SENDAI, JAPAN

Search Grid
Hospital
Police
School

UNCLASSIFIED/FOUO
Sendai, Japan

1K Grid Cell: 54SVH8634
10K Map Series: 54SVH83

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH

Map / Vector Data Source: Map data ©OSM CC-BY-SA
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Sendai, Japan

INDEX MAP

Search Grid
Hospital
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UNCLASSIFIED/FOUO
SENDAI, JAPAN

1K GRID CELL: 54SVH8635  10K MAP SERIES: 54SVH83

SENDAI, JAPAN

INDEX MAP

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
(Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

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Search Grid
Hospital
Police
School
Sendai, Japan

1K Grid Cell: 54SVH8642
10K Map Series: 54SVH84

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: OSM CC-BY-SA
(Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

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Index Map

Sendai, Japan

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SENDAI, JAPAN

1K GRID CELL: 54SVH8730
10K MAP SERIES: 54SVH83

Grid Zone Designation: VH

Map / Vector Data Source: Map data ©OSM CC-BY-SA (Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

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SENDAI, JAPAN

UNCLASSIFIED//FOUO
SEARCH GRID

SG

Police

Hospital

School

MGRS

100,000-m Square Grid

VH

54S

Grid Zone Designation

100,000-m Square Identification: VH

World Geodetic System 1984 Datum

100,000-m Square Identification: VH

Map / Vector Data Source: Map data ©OSM CC-BY-SA
(Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

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SENDAI, JAPAN

1K GRID CELL: 54SVH8739

10K MAP SERIES: 54SVH83

SENDAI, JAPAN

INDEX MAP

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SENDAI, JAPAN

1K Grid Cell: 54SVH8742
10K Map Series: 54SVH84

MGRS
100,000-M Square Grid

VH

World Geodetic System 1984 Datum
Grid Zone Designation: 54S

100,000-M Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
(OpenStreetMap) (These are national level assets and cannot be verified accurate at the local level.)

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INDEX MAP

SENDAI, JAPAN

Search Grid
Hospital
Police
School

UNCLASSIFIED//FOUO
UNCLASSIFIED/FOUO

SENDAI, JAPAN
1K Grid Cell: 54SVH8745  10K Map Series: 54SVH84

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S

100,000-m Square Identification: VH

Map / Vector Data Source: Map data ©OSM CC-BY-SA
(Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

Not to be used for navigation.
For information and planning purposes only.

INDEX MAP

MGSRS
100,000-m Square Grid

VH

54S
Grid Zone Designation

SENDAI, JAPAN

Search Grid
Hospital
Police
School

Unclassified/FOUO
INDEX MAP

SENDAI, JAPAN

1K GRID CELL: 54SVH8826
10K MAP SERIES: 54SVH82

1:6,000 Scale

Meters

0 50 100 200 300 400

Feet

0 162.5 325 650 975 1,300

MGRS

100,000-m Square Grid

VH

54S

Grid Zone Designation

Search Grid
Hospital
Police
School

SENDAI, JAPAN

MAPSHEET 75 of 400

Not to be used for navigation.
For information and planning purposes only.

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data OSM CC-BY-SA
(Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)
SENDAI, JAPAN

1K GRID CELL: 54SVH838
10K MAP SERIES: 54SVH83

INDEX MAP
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SENDAI, JAPAN

Search Grid
Hospital
Police
School

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
(World Street Map) (These are national level assets and cannot be verified accurate at the local level.)

Not to be used for navigation.
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1:6,000 Scale

MGRS
100,000-m Square Grid

VH

54S
Grid Zone Designation

UNCLASSIFIED//FOUO
NAKADA

489000m E

1K GRID CELL: 54SVH8927
10K MAP SERIES: 54SVH82

SENDAI, JAPAN

INDEX MAP

MAPSHEET 102 of 400

SENDAI, JAPAN

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
(Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

Not to be used for navigation.
For information and planning purposes only.

MGRS
100,000-m Square Grid
VH

Grid Zone Designation

Search Grid
Hospital
Police
School
SENDAI, JAPAN

1K GRID CELL: 54SVH8945
10K MAP SERIES: 54SVH84

INDEX MAP

Search Grid
Hospital
Police
School

UNCLASSIFIED//FOUO
SENDAI, JAPAN
1K GRID CELL: 54SVH9031
10K MAP SERIES: 54SVH93

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OpenStreetMap
(Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)
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For information and planning purposes only.
SENDAI, JAPAN

INDEX MAP

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SENDAI, JAPAN

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA (Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

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For information and planning purposes only.

MGRS
100,000-m Square Grid

VH

54S
Grid Zone Designation

Search Grid
Hospital
Police
School

INDEX MAP

SENDIA, JAPAN

1:6,000 Scale

0 50 100 200 300 400
Meters
62.5 325 650 975 1,300
Feet

SENDAI, JAPAN

UNCLASSIFIED//FOUO
Sentai, Japan

1K Grid Cell: 54SVH9042 10K Map Series: 54SVH94

MGRS
100,000-m Square Grid

Grid Zone Designation: VH

World Geodetic System 1984 Datum

Map / Vector Data Source: Map data ©OSM CC-BY-SA
(Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

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Index Map

Sendai, Japan

Search Grid
Hospital
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School

UNCLASSIFIED//FOUO
SENDAI, JAPAN
1K GRID CELL: 54SVH9122  10K MAP SERIES: 54SVH92

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SENDAI, JAPAN

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH

Map / Vector Data Source: Map data ©OSM CC-BY-SA
(Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

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MGCRS
100,000-m Square Grid

VH

54S
Grid Zone Designation

Search Grid
Hospital
Police
School
SENDAI, JAPAN
1K GRID CELL: 54SVH9123
10K MAP SERIES: 54SVH92

KOYA

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
(Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

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UNCLASSIFIED//FOUO
Sendai, Japan

1K Grid Cell: 54SVH9136
10K Map Series: 54SVH93

MGRS
100,000-m Square Grid
VH

World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH

Map / Vector Data Source: Map data ©OSM CC-BY-SA
(Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

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Search Grid
Hospital
Police
School

Sendai, Japan

INDEX MAP

MAPSHEET 163 of 400
SENDAI, JAPAN

1K GRID CELL: 54SVH9138
10K MAP SERIES: 54SVH93

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
(Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

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SENDAI, JAPAN

INDEX MAP

UNCLASSIFIED//FOUO
SENDAI, JAPAN

1K GRID CELL: 54SVH9142
10K MAP SERIES: 54SVH94

INDEX MAP

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SENDAI, JAPAN

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S

100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
(Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

Not to be used for navigation.
For information and planning purposes only.

MGRS
100,000-m Square Grid

VH

54S
Grid Zone Designation

1:6,000 Scale

Meters

Feet

0 50 100 200 300 400
0 162.5 325 650 975 1,300

Search Grid
Hospital
Police
School

UNCLASSIFIED//FOUO
SHIMO-MASUDA

SENDAI, JAPAN

1K GRID CELL: 54SVH9223
10K MAP SERIES: 54SVH92

INDEX MAP

1K GRID CELL: 54SVH9223
10K MAP SERIES: 54SVH92

SENDAI, JAPAN

1:6,000 Scale

Search Grid
Hospital
Police
School

UNCLASSIFIED//FOUO
SENDAI, JAPAN

1K GRID CELL: 54SVH9232
10K MAP SERIES: 54SVH93

INDEX MAP

SENDAI, JAPAN

1:6,000 Scale

Map / Vector Data Source: Map data ©OSM CC-BY-SA (Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

Not to be used for navigation. For information and planning purposes only.

MGRS
100,000-m Square Grid

VH

54S
Grid Zone Designation

Search Grid
Hospital
Police
School

0 50 100 200 300 400 Meters
0 162.5 325 650 975 1,300 Feet

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA (Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

Not to be used for navigation. For information and planning purposes only.

SENDAI, JAPAN

UNCLASSIFIED//FOUO
UNCLASSIFIED/FOUO

SENDAI, JAPAN
1K GRID CELL: 54SVH9247
10K MAP SERIES: 54SVH94

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
(Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

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For information and planning purposes only.

INDEX MAP

SENDAI, JAPAN

MAPSHEET 199 of 400

MGRS
100,000-m Square Grid

VH

54S
Grid Zone Designation

Search Grid
Hospital
Police
School
1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
(Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

Not to be used for navigation.
For information and planning purposes only.

Search Grid
Hospital
Police
School
SENDAI, JAPAN

1K GRID CELL: 54SVH9334
10K MAP SERIES: 54SVH93

INDEX MAP

MAPSHEET 211 of 400

SENDAI, JAPAN

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
(Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

Not to be used for navigation.
For information and planning purposes only.

MGRS

100,000-m Square Grid

VH

54S

Grid Zone Designation

Search Grid
Hospital
Police
School
SENDAI, JAPAN

1K GRID CELL: 54SVH9339  10K MAP SERIES: 54SVH93

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
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SENDAI, JAPAN
1K GRID CELL: 54SVH9340  10K MAP SERIES: 54SVH94

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
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SENDAI, JAPAN

Search Grid
Hospital
Police
School

MG RS
100,000-m Square Grid
VH
54S
Grid Zone Designation

1:6,000 Scale

0 50 100 200 300 400 Meters
0 162.5 325 650 975 1,300 Feet

Sendai, Japan
SENDAI, JAPAN

INDEX MAP

1K GRID CELL: 54SVH9346 10K MAP SERIES: 54SVH94

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH

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SENDAI, JAPAN

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SENDAI, JAPAN
1K GRID CELL: 54SVH9432  10K MAP SERIES: 54SVH93

SENDAI, JAPAN
INDEX MAP

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
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SENDAI, JAPAN

1K GRID CELL: 54SVH9444
10K MAP SERIES: 54SVH94

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH

Map / Vector Data Source: Map data ©OSM CC-BY-SA
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1K GRID CELL: 54SVH9529
10K MAP SERIES: 54SVH92

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
(Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

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SEARCH GRID

MGRS
100,000-m Square Grid

VH

54S
Grid Zone Designation

SENDAI, JAPAN
INDEX MAP

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SENDAI, JAPAN

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
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SENDAI, JAPAN

1K GRID CELL: 54SVH9627 10K MAP SERIES: 54SVH92

SEARCH GRID
Search Grid

HOSPITAL
Hospital

POLICE
Police

SCHOOL
School

INDEX MAP

SENDAL, JAPAN

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
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SENDAI, JAPAN

1K GRID CELL: 54SVH9628
10K MAP SERIES: 54SVH92

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SENDAI, JAPAN

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
(Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

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Search Grid
Hospital
Police
School

231 254 277 297 314
230 253 276 296 313
229 252 275 295
228 251 274 294
227 250 273 293
SENDAI, JAPAN

1K GRID CELL: 54SVH9643
10K MAP SERIES: 54SVH94

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
(Open Street Map) (These are national level
assets and cannot be verified accurate at the local level.)

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For information and planning purposes only.

INDEX MAP

SENDAI, JAPAN

1:6,000 Scale

0 50 100 200 300 400 Meters
0 162.5 325 650 975 1,300 Feet

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246 269 292 312
245 268 291 311
244 267 290 310 327
243 266 289 309 326
242 265 288 308 325
SENDAI, JAPAN

1K GRID CELL: 54SVH9730
10K MAP SERIES: 54SVH93

INDEX MAP

SENDAI, JAPAN

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
(Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

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MGRS
100,000-m Square Grid

VH

54S

Grid Zone Designation

Search Grid
Hospital
Police
School

UNCLASSIFIED//FOUO
SENDAI, JAPAN
1K GRID CELL: 54SVH9740
10K MAP SERIES: 54SVH94

INDEX MAP

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
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SGENDAI, JAPAN
1K GRID CELL: 54SVH9742
10K MAP SERIES: 54SVH94

Legend:
- Search Grid
- Hospital
- Police
- School

Index Map:
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SENDAI, JAPAN

1K GRID CELL: 54SVH9837

10K MAP SERIES: 54SVH93

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
(Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

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SENDAI, JAPAN

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MGRS

Search Grid

Hospital

Police

School

1:6,000 Scale

0 50 100 200 300 400
Meters

0 162.5 325 650 975 1,300
Feet

UNCLASSIFIED//FOUO
Sendai, Japan

1K Grid Cell: 54 SVH 9933
10K Map Series: 54 SVH 93

MGRS
100,000-m Square Grid
Grid Zone Designation: 54S

World Geodetic System 1984 Datum

Map / Vector Data Source: Map data ©OSM CC-BY-SA
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Search Grid
Hospital
Police
School

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SENDAI, JAPAN

1K GRID CELL: 54SVH9936
10K MAP SERIES: 54SVH93

INDEX MAP

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S

100,000-m Square Identification: VH
Map / Vector Data Source: Map data ©OSM CC-BY-SA
(Open Street Map) (These are national level assets and cannot be verified accurate at the local level.)

SENDAI, JAPAN

Search Grid
Hospital
Police
School

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SENDAI, JAPAN

1K GRID CELL: 54SVH9940
10K MAP SERIES: 54SVH94

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH

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INDEX MAP

SENDAI, JAPAN

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Search Grid
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Grid Zone Designation

MGRS
100,000-m Square Grid

VH

54S
SENDAI, JAPAN

1K GRID CELL: 54SVH9941
10K MAP SERIES: 54SVH94

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: VH
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SENDAI, JAPAN

MGARS
100,000-m Square Grid
VH
54S
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Search Grid
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UNCLASSIFIED//FOUO
SENDAI, JAPAN

1K GRID CELL: 54SVH9942
10K MAP SERIES: 54SVH94

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SENDAI, JAPAN

1000-m cell, 100-m grid, MGRS

World Geodetic System 1984 Datum

Grid Zone Designation: 54S

100,000-m Square Identification: VH

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MGRS

100,000-m Square Grid

VH

54S

Grid Zone Designation
SENDAI, JAPAN
1K GRID CELL: 54SWH0037 10K MAP SERIES: 54SWH03

MGRS
100,000-m Square Grid

World Geodetic System 1984 Datum
Grid Zone Designation: 54S

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SEARCH GRID
Hospital
Police
School

323 322 321 320 319
337 336 335 334 333
350 349 348 347 346
361 360 359 358 357
370 369 368 367 366
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1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S

100,000-m Square Identification: WH
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SENDAI, JAPAN

1K GRID CELL: 54SWH0133 10K MAP SERIES: 54SWH03

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: WH

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SENDAI, JAPAN
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SENDAI, JAPAN

1K GRID CELL: 54SWH0141
10K MAP SERIES: 54SWH04

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Search Grid
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1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: WH

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SENDAI, JAPAN

1K GRID CELL: 54SWH0336
10K MAP SERIES: 54SWH03

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: WH

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1K GRID CELL: 54SWH0539
10K MAP SERIES: 54SWH03

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SENDAI, JAPAN

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Search Grid
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INDEX MAP

MGRS
100,000-m Square Grid

WH

54S
Grid Zone Designation

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: WH

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SENDAI, JAPAN

1K GRID CELL: 54SWH0638  10K MAP SERIES: 54SWH03

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: WH
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Sendai, Japan

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- **Police**
- **School**
SENDAI, JAPAN

1K GRID CELL: 54SWH0640
10K MAP SERIES: 54SWH04

1000-m cell, 100-m grid, MGRS
World Geodetic System 1984 Datum
Grid Zone Designation: 54S
100,000-m Square Identification: WH

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