【参考】LandXML 1.2 のサブセットスキーマ

LandXML 1.2 から必要最小限の要素と属性を抽出したサブセットに、日本仕様を拡張した XML スキーマを以下に示す。

```xml
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns="http://www.landxml.org/schema/LandXML-1.2" targetNamespace="http://www.landxml.org/schema/LandXML-1.2" version="1.2">
    <xs:element name="LandXML">
      <xs:complexType>
        <xs:choice maxOccurs="unbounded">
          <xs:element ref="Project" minOccurs="0"/>
          <xs:element ref="Application" minOccurs="0" maxOccurs="unbounded"/>
          <xs:element ref="CoordinateSystem" minOccurs="0"/>
          <xs:element ref="Units"/>
          <xs:element ref="CgPoints" minOccurs="0" maxOccurs="unbounded"/>
          <xs:element ref="Alignments" minOccurs="0" maxOccurs="unbounded"/>
          <xs:element ref="Roadways" minOccurs="0" maxOccurs="unbounded"/>
          <xs:element ref="Surfaces" minOccurs="0" maxOccurs="unbounded"/>
        </xs:choice>
        <xs:attribute name="date" type="xs:date" use="required"/>
        <xs:attribute name="time" type="xs:time" use="required"/>
        <xs:attribute name="version" type="xs:string" use="required"/>
      </xs:complexType>
      <xs:unique name="uCgPointsName">
        <xs:selector xpath="CgPoints"/>
        <xs:field xpath="@name"/>
      </xs:unique>
      <xs:unique name="uRoadwayName">
        <xs:selector xpath="Roadways/Roadway"/>
        <xs:field xpath="@name"/>
      </xs:unique>
    </xs:element>
    <xs:simpleType name="angle">
      <xs:annotation>
        <xs:documentation>Represents a normalized angular value in the specified Angular units. Assume 0 degrees = east</xs:documentation>
      </xs:annotation>
      <xs:restriction base="xs:double"/>
    </xs:simpleType>
    <xs:simpleType name="station">
      <xs:annotation>
        <xs:documentation>Represents the actual measured distance along the geometry in numeric decimal form expressed in linear units. Also known as the internal station value where no station equations are applied.</xs:documentation>
      </xs:annotation>
      <xs:restriction base="xs:double"/>
```

```xml
      </xs:simpleType>
      <xs:simpleType name="pointNameRef">
        <xs:annotation>
          <xs:documentation>A reference name value referring to a PointType derived name attribute. An attribute if this type contains the value of a PointType derived element "name" attribute that exists
elsewhere the instance data.</xs:documentation>
        </xs:annotation>
        <xs:restriction base="xs:string"/>
      </xs:simpleType>
      <xs:simpleType name="alignmentNameRefs">
        <xs:annotation>
          <xs:documentation>A list of reference names values refering to one or more Alignment.name attributes.</xs:documentation>
        </xs:annotation>
        <xs:list itemType="xs:string"/>
      </xs:simpleType>
      <xs:simpleType name="featureNameRef">
        <xs:annotation>
          <xs:documentation>A Feature element name attribute reference value refering to one Feature.name attribute.</xs:documentation>
        </xs:annotation>
        <xs:restriction base="xs:string"/>
      </xs:simpleType>
      <xs:simpleType name="clockwise">
        <xs:restriction base="xs:string">
          <xs:enumeration value="cw"/>
          <xs:enumeration value="ccw"/>
        </xs:restriction>
      </xs:simpleType>
      <xs:simpleType name="metArea">
        <xs:restriction base="xs:string">
          <xs:enumeration value="hectare"/>
          <xs:enumeration value="squareMeter"/>
          <xs:enumeration value="squareMillimeter"/>
          <xs:enumeration value="squareCentimeter"/>
        </xs:restriction>
      </xs:simpleType>
      <xs:simpleType name="metLinear">
        <xs:restriction base="xs:string">
          <xs:enumeration value="millimeter"/>
          <xs:enumeration value="centimeter"/>
          <xs:enumeration value="meter"/>
          <xs:enumeration value="kilometer"/>
        </xs:restriction>
      </xs:simpleType>
      <xs:simpleType name="metPressure">
        <xs:restriction base="xs:string">
          <xs:enumeration value="HPA"/>
          <xs:enumeration value="milliBars"/>
```

```xml
            <xs:enumeration value="mmHG"/>
            <xs:enumeration value="millimeterHG"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="metTemperature">
        <xs:restriction base="xs:string">
            <xs:enumeration value="celsius"/>
            <xs:enumeration value="kelvin"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="metVolume">
        <xs:restriction base="xs:string">
            <xs:enumeration value="cubicMeter"/>
            <xs:enumeration value="liter"/>
            <xs:enumeration value="hectareMeter"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="spiralType">
        <xs:restriction base="xs:string">
            <xs:enumeration value="biquadratic"/>
            <xs:enumeration value="bloss"/>
            <xs:enumeration value="clothoid"/>
            <xs:enumeration value="cosine"/>
            <xs:enumeration value="cubic"/>
            <xs:enumeration value="sinusoid"/>
            <xs:enumeration value="revBiquadratic"/>
            <xs:enumeration value="revBloss"/>
            <xs:enumeration value="revCosine"/>
            <xs:enumeration value="revSinusoid"/>
            <xs:enumeration value="sineHalfWave"/>
            <xs:enumeration value="biquadraticParabola"/>
            <xs:enumeration value="cubicParabola"/>
            <xs:enumeration value="japaneseCubic"/>
            <xs:enumeration value="radioid"/>
            <xs:enumeration value="weinerBogen"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="stateType">
        <xs:restriction base="xs:string">
            <xs:enumeration value="abandoned"/>
            <xs:enumeration value="destroyed"/>
            <xs:enumeration value="existing"/>
            <xs:enumeration value="proposed"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="dataFormatType">
```

```xml
      <xs:annotation>
        <xs:documentation/>
      </xs:annotation>
      <xs:restriction base="xs:string">
        <xs:enumeration value="Offset Elevation"/>
        <xs:enumeration value="Slope Distance"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="Point">
      <xs:annotation>
        <xs:documentation>A text value that is a space delimited list of doubles. It is used as the base type to define point coordinates in the form of "northing easting" or "northing easting elevation" as
well as point lists of 2D or 3D points with items such as surface boundaries or "station elevation", "station offset" lists for items such as profiles and cross sections:
   Example, "1632.546 2391.045 240.30"</xs:documentation>
      </xs:annotation>
      <xs:list itemType="xs:double"/>
    </xs:simpleType>
    <xs:simpleType name="Point3dOpt">
      <xs:restriction base="Point">
        <xs:minLength value="0"/>
        <xs:maxLength value="3"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="Point2dReq">
      <xs:restriction base="Point">
        <xs:length value="2"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:complexType name="PointType" mixed="true">
      <xs:annotation>
        <xs:documentation>All elements derived from PointType will either contain a coordinate text value ( "north east" or "north east elev"), a "pntRef" attribute value, or both. The "pntRef" attribute
contains the value of a PointType derived element "name" attribute that exists elsewhere the instance data. If this element has a "pntRef" value, then it's coordinates will be retrieved from the referenced
element. If an element contains both a coordinate value and a pntRef, the coordinate value should be used as the point location and the referenced point is either ignored or is used for point attributes such
as number or desc.</xs:documentation>
        <xs:documentation>The featureRef attribute points to a specific named Feature element that contains feature data related to the point.
        The suggested form is to refer to a feature element within the same CgPoints group or parent element of the point element.
        </xs:documentation>
      </xs:annotation>
      <xs:simpleContent>
        <xs:extension base="Point3dOpt">
          <xs:attribute name="name" type="xs:string"/>
          <xs:attribute name="desc" type="xs:string"/>
          <xs:attribute name="code" type="xs:string"/>
          <xs:attribute name="state" type="stateType"/>
          <xs:attribute name="featureRef" type="featureNameRef" use="optional"/>
          <xs:attribute name="timeStamp" type="xs:dateTime" use="optional"/>
        </xs:extension>
```

```xml
      </xs:simpleContent>
    </xs:complexType>
    <xs:element name="CgPoints">
      <xs:annotation>
        <xs:documentation>座標点セット</xs:documentation>
      </xs:annotation>
      <xs:complexType>
        <xs:sequence>
          <xs:element ref="CgPoint" minOccurs="0" maxOccurs="unbounded"/>
          <xs:element ref="Feature" minOccurs="0" maxOccurs="unbounded"/>
          <!-- Allow nested CgPoints collections -->
        </xs:sequence>
        <xs:attribute name="desc" type="xs:string"/>
        <xs:attribute name="name" type="xs:string"/>
      </xs:complexType>
      <xs:unique name="uPntName">
        <xs:selector xpath="CgPoint"/>
        <xs:field xpath="@name"/>
      </xs:unique>
    </xs:element>
    <xs:element name="CgPoint">
      <xs:annotation>
        <xs:documentation>座標点</xs:documentation>
      </xs:annotation>
      <xs:complexType mixed="true">
        <xs:simpleContent>
          <xs:extension base="PointType"/>
        </xs:simpleContent>
      </xs:complexType>
    </xs:element>
    <xs:element name="Property">
      <xs:annotation>
        <xs:documentation>プロパティ</xs:documentation>
        <xs:documentation>The "label" attribute defines the name of the value held in the "value" attribute.</xs:documentation>
      </xs:annotation>
      <xs:complexType>
        <xs:attribute name="label" use="required"/>
        <xs:attribute name="value" use="required"/>
      </xs:complexType>
    </xs:element>
    <xs:element name="Feature">
      <xs:annotation>
        <xs:documentation>フィーチャ</xs:documentation>
        <xs:documentation>Each Property element defines one piece of data.</xs:documentation>
      </xs:annotation>
```

```xml
    <xs:complexType>
      <xs:sequence>
        <xs:element ref="Property" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
      <xs:attribute name="name" type="xs:string" use="optional"/>
    </xs:complexType>
  </xs:element>
  <xs:element name="PntList2D">
    <xs:annotation>
      <xs:documentation>2 次元座標リスト</xs:documentation>
      <xs:documentation>It is primarily used for ProfileSurf to hold the list of station/elevations and CrossSectSurf for offset/elevation. </xs:documentation>
      <xs:documentation>Example: "0.000 86.52 6.267 86.89 12.413 87.01 26.020 87.83" </xs:documentation>
    </xs:annotation>
    <xs:simpleType>
      <xs:restriction base="Point">
        <xs:minLength value="2"/>
      </xs:restriction>
    </xs:simpleType>
  </xs:element>
  <xs:element name="Start" type="PointType">
    <xs:annotation>
      <xs:documentation>開始点</xs:documentation>
      <xs:documentation>Defined by either a coordinate text value ("north east" or "north east elev") or a CgPoint number reference "pntRef" attribute.</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="End" type="PointType">
    <xs:annotation>
      <xs:documentation>終了点</xs:documentation>
      <xs:documentation>Defined by either a coordinate text value ("north east" or "north east elev") or a CgPoint number reference "pntRef" attribute.</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="Center" type="PointType">
    <xs:annotation>
      <xs:documentation>中心点</xs:documentation>
      <xs:documentation>Defined by either a coordinate text value ("north east" or "north east elev") or a CgPoint number reference "pntRef" attribute.</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="PI" type="PointType">
    <xs:annotation>
      <xs:documentation>交点</xs:documentation>
      <xs:documentation>Defined by either a coordinate text value ("north east" or "north east elev") or a CgPoint number reference "pntRef" attribute.</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="Curve">
    <xs:annotation>
```

```
        <xs:documentation>円曲線</xs:documentation>
        <xs:documentation>The rotation attribute "rot" defines whether the arc travels clockwise or counter-clockwise from the Start to End point.</xs:documentation>
      </xs:annotation>
      <xs:complexType>
        <xs:choice minOccurs="3" maxOccurs="unbounded">
          <xs:element ref="Start"/>
          <xs:element ref="Center"/>
          <xs:element ref="End"/>
        </xs:choice>
        <xs:attribute name="rot" type="clockwise" use="required"/>
        <xs:attribute name="length" type="xs:double"/>
        <xs:attribute name="name" type="xs:string"/>
        <xs:attribute name="radius" type="xs:double"/>
      </xs:complexType>
  </xs:element>
  <xs:element name="Spiral">
    <xs:annotation>
      <xs:documentation>緩和曲線</xs:documentation>
      <xs:documentation>This conforms to XML Schema which defines infinity as "INF" or "-INF" for all numeric datatypes </xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:sequence>
        <xs:choice minOccurs="3" maxOccurs="3">
          <xs:element ref="Start"/>
          <xs:element ref="PI"/>
          <xs:element ref="End"/>
        </xs:choice>
        <xs:element ref="Feature" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
      <xs:attribute name="length" type="xs:double" use="required"/>
      <xs:attribute name="radiusEnd" type="xs:double" use="required"/>
      <xs:attribute name="radiusStart" type="xs:double" use="required"/>
      <xs:attribute name="rot" type="clockwise" use="required"/>
      <xs:attribute name="spiType" type="spiralType" use="required"/>
      <xs:attribute name="name" type="xs:string"/>
    </xs:complexType>
  </xs:element>
  <xs:element name="CoordGeom">
    <xs:annotation>
      <xs:documentation>幾何要素</xs:documentation>
      <xs:documentation>After the sequential list of elements an optional vertical geometry
      may be defined as a profile, which may be as simple as a list of PVIs (point to point 3D line string).</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:sequence>
```

```
      <xs:choice maxOccurs="unbounded">
        <xs:element ref="Line" minOccurs="0" maxOccurs="unbounded"/>
        <xs:element ref="Curve" minOccurs="0" maxOccurs="unbounded"/>
        <xs:element ref="Spiral" minOccurs="0" maxOccurs="unbounded"/>
      </xs:choice>
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:element name="Line">
  <xs:annotation>
    <xs:documentation>直線</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="Start"/>
      <xs:element ref="End"/>
    </xs:sequence>
    <xs:attribute name="length" type="xs:double"/>
    <xs:attribute name="name" type="xs:string"/>
  </xs:complexType>
</xs:element>
<xs:element name="CrossSects">
  <xs:annotation>
    <xs:documentation>横断形状セット</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="CrossSect" maxOccurs="unbounded"/>
      <xs:element ref="Feature" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="desc" type="xs:string"/>
    <xs:attribute name="name" type="xs:string"/>
  </xs:complexType>
  <xs:unique name="uCrossSectSta">
    <xs:selector xpath="CrossSect"/>
    <xs:field xpath="@sta"/>
  </xs:unique>
</xs:element>
<xs:element name="CrossSect">
  <xs:annotation>
    <xs:documentation>横断面</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="CrossSectSurf" minOccurs="0" maxOccurs="unbounded"/>
```

```xml
        <xs:element ref="DesignCrossSectSurf" minOccurs="0" maxOccurs="unbounded"/>
        <xs:element ref="Feature" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
      <xs:attribute name="sta" type="xs:double" use="required"/>
      <xs:attribute name="name" type="xs:string"/>
      <xs:attribute name="desc" type="xs:string"/>
      <xs:attribute name="angleSkew" type="angle"/>
    </xs:complexType>
  </xs:element>
  <xs:element name="CrossSectSurf">
    <xs:annotation>
      <xs:documentation>地形情報</xs:documentation>
      <xs:documentation>Example: "-60.00 1.52 -36.26 0.89 12.41 2.01 60.00 1.83"</xs:documentation>
      <xs:documentation>Note: Gaps in the surface are handled by having 2 or more PntList2D elements.</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:sequence>
        <xs:element ref="PntList2D" maxOccurs="unbounded"/>
      </xs:sequence>
      <xs:attribute name="name" type="xs:string" use="required"/>
    </xs:complexType>
  </xs:element>
  <xs:element name="CrossSectPnt">
    <xs:annotation>
      <xs:documentation>構成点</xs:documentation>
    </xs:annotation>
    <xs:complexType mixed="true">
      <xs:simpleContent>
        <xs:extension base="PointType">
          <xs:attribute name="dataFormat" type="dataFormatType" default="Offset Elevation"/>
        </xs:extension>
      </xs:simpleContent>
    </xs:complexType>
  </xs:element>
  <xs:element name="DesignCrossSectSurf">
    <xs:annotation>
      <xs:documentation>構築形状</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:sequence>
        <xs:element ref="CrossSectPnt" minOccurs="0" maxOccurs="unbounded"/>
        <xs:element ref="Feature" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
      <xs:attribute name="name" type="xs:string"/>
      <xs:attribute name="desc" type="xs:string"/>
```

```xml
        <xs:attribute name="side" type="sideofRoadType"/>
        <xs:attribute name="material" type="xs:string"/>
        <xs:attribute name="closedArea" type="xs:boolean"/>
        <xs:attribute name="typicalThickness" type="xs:double"/>
      </xs:complexType>
  </xs:element>
  <xs:simpleType name="sideofRoadType">
    <xs:restriction base="xs:string">
      <xs:enumeration value="right"/>
      <xs:enumeration value="left"/>
      <xs:enumeration value="both"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:element name="Project">
    <xs:annotation>
      <xs:documentation>プロジェクト情報</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:choice minOccurs="0" maxOccurs="unbounded">
        <xs:element ref="Feature" minOccurs="0" maxOccurs="unbounded"/>
      </xs:choice>
      <xs:attribute name="name" type="xs:string" use="required"/>
      <xs:attribute name="desc" type="xs:string"/>
    </xs:complexType>
  </xs:element>
  <xs:element name="Units">
    <xs:annotation>
      <xs:documentation>単位系</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:choice>
        <xs:element ref="Metric"/>
      </xs:choice>
    </xs:complexType>
  </xs:element>
  <xs:element name="Metric">
    <xs:annotation>
      <xs:documentation>メートル法</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:attribute name="areaUnit" type="metArea" use="required"/>
      <xs:attribute name="linearUnit" type="metLinear" use="required"/>
      <xs:attribute name="volumeUnit" type="metVolume" use="required"/>
      <xs:attribute name="temperatureUnit" type="metTemperature" use="required"/>
      <xs:attribute name="pressureUnit" type="metPressure" use="required"/>
```

```xml
      <xs:attribute name="angularUnit" type="angularType" default="radians"/>
      <xs:attribute name="directionUnit" type="angularType" default="radians"/>
    </xs:complexType>
  </xs:element>
  <!-- Anglular Units element definition-->
  <xs:simpleType name="angularType">
    <xs:annotation>
      <xs:documentation>angular values expressed in "decimal dd.mm.ss" units have the numeric
      format "45.3025" representing 45 degrees 30 minutes and 25 seconds. Both the minutes and seconds must be two characters with a numeric range between 00 to 60.
      </xs:documentation>
    </xs:annotation>
    <xs:restriction base="xs:string">
      <xs:enumeration value="radians"/>
      <xs:enumeration value="grads"/>
      <xs:enumeration value="decimal degrees"/>
      <xs:enumeration value="decimal dd.mm.ss"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:element name="CoordinateSystem">
    <xs:annotation>
      <xs:documentation>座標参照系</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:sequence>
        <xs:element ref="Feature" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
      <xs:attribute name="desc" type="xs:string"/>
      <xs:attribute name="name" type="xs:string"/>
      <xs:attribute name="horizontalDatum" type="xs:string"/>
      <xs:attribute name="verticalDatum" type="xs:string"/>
      <xs:attribute name="horizontalCoordinateSystemName" type="xs:string"/>
      <!--   The attributes below are provided for backward compatibility only and should no longer be used. -->
    </xs:complexType>
  </xs:element>
  <xs:element name="Application">
    <xs:annotation>
      <xs:documentation>アプリケーション情報</xs:documentation>
    </xs:annotation>
    <xs:complexType mixed="true">
      <xs:sequence>
        <xs:element ref="Author" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
      <xs:attribute name="name" type="xs:string" use="required"/>
    </xs:complexType>
  </xs:element>
```

```xml
<xs:element name="Author">
  <xs:annotation>
    <xs:documentation>作成者情報</xs:documentation>
  </xs:annotation>
  <xs:complexType mixed="true">
    <xs:attribute name="createdBy" type="xs:string"/>
    <xs:attribute name="company" type="xs:string"/>
  </xs:complexType>
</xs:element>
<xs:element name="Alignments">
  <xs:annotation>
    <xs:documentation>中心線形セット</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="Alignment" maxOccurs="unbounded"/>
      <xs:element ref="Feature" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="desc" type="xs:string"/>
    <xs:attribute name="name" type="xs:string"/>
  </xs:complexType>
  <xs:unique name="uAlnName">
    <xs:selector xpath="Alignment"/>
    <xs:field xpath="@name"/>
  </xs:unique>
</xs:element>
<xs:element name="Alignment">
  <xs:annotation>
    <xs:documentation>中心線形</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:choice maxOccurs="unbounded">
      <xs:choice>
        <xs:element ref="CoordGeom"/>
        <xs:element ref="AlignPIs" minOccurs="0"/>
      </xs:choice>
      <xs:element ref="StaEquation" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="Profile" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="CrossSects" minOccurs="0"/>
      <xs:element ref="Feature" minOccurs="0" maxOccurs="unbounded"/>
    </xs:choice>
    <xs:attribute name="name" type="xs:string" use="required"/>
    <xs:attribute name="length" type="xs:double" use="required"/>
    <xs:attribute name="staStart" type="xs:double" use="required"/>
    <xs:attribute name="desc" type="xs:string"/>
```

```xml
    </xs:complexType>
  </xs:element>
  <xs:element name="StaEquation">
    <xs:annotation>
      <xs:documentation>測点定義</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:attribute name="staAhead" type="xs:double" use="required"/>
      <xs:attribute name="staBack" type="xs:double"/>
      <xs:attribute name="staInternal" type="xs:double" use="required"/>
    </xs:complexType>
  </xs:element>
  <xs:element name="Profile">
    <xs:annotation>
      <xs:documentation>縦断形状</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:sequence>
        <xs:choice maxOccurs="unbounded">
          <xs:element ref="ProfAlign" minOccurs="0" maxOccurs="unbounded"/>
          <xs:element ref="ProfSurf" minOccurs="0" maxOccurs="unbounded"/>
        </xs:choice>
      </xs:sequence>
      <xs:attribute name="name" type="xs:string"/>
      <xs:attribute name="staStart" type="xs:double"/>
    </xs:complexType>
  </xs:element>
  <xs:element name="ProfSurf">
    <xs:annotation>
      <xs:documentation>縦断地盤線</xs:documentation>
      <xs:documentation>It is defined with a space delimited PntList2D of station/elevations pairs. </xs:documentation>
      <xs:documentation>Example: "0.000 86.52 6.267 86.89 12.413 87.01 26.020 87.83" </xs:documentation>
      <xs:documentation>Note: Gaps in the profile are handled by having 2 or more PntList2D elements.</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:sequence>
        <xs:element ref="PntList2D" maxOccurs="unbounded"/>
      </xs:sequence>
      <xs:attribute name="name" type="xs:string" use="required"/>
      <xs:attribute name="desc" type="xs:string"/>
    </xs:complexType>
  </xs:element>
  <xs:element name="ProfAlign">
    <xs:annotation>
      <xs:documentation>縦断線形</xs:documentation>
```

```xml
      <xs:documentation>It is defined by a sequential series of any combination of the four "PVI" element types.</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:sequence>
        <xs:choice maxOccurs="unbounded">
          <xs:element ref="PVI" minOccurs="0" maxOccurs="unbounded"/>
          <xs:element ref="ParaCurve" minOccurs="0" maxOccurs="unbounded"/>
        </xs:choice>
      </xs:sequence>
      <xs:attribute name="name" type="xs:string" use="required"/>
      <xs:attribute name="desc" type="xs:string"/>
    </xs:complexType>
  </xs:element>
  <xs:element name="PVI">
    <xs:annotation>
      <xs:documentation>縦断勾配変移点</xs:documentation>
    </xs:annotation>
    <xs:complexType mixed="true">
      <xs:simpleContent>
        <xs:extension base="Point2dReq"/>
      </xs:simpleContent>
    </xs:complexType>
  </xs:element>
  <xs:element name="ParaCurve">
    <xs:annotation>
      <xs:documentation>縦断曲線</xs:documentation>
    </xs:annotation>
    <xs:complexType mixed="true">
      <xs:simpleContent>
        <xs:extension base="Point2dReq">
          <xs:attribute name="length" type="xs:double" use="required"/>
        </xs:extension>
      </xs:simpleContent>
    </xs:complexType>
  </xs:element>
  <xs:simpleType name="speed">
    <xs:annotation>
      <xs:documentation>This item is the speed or velocity of travel. The unit of measure for this item is kilometers/hour for Metric units and miles/hour for Imperial. </xs:documentation>
    </xs:annotation>
    <xs:restriction base="xs:double"/>
  </xs:simpleType>
  <xs:element name="Roadways">
    <xs:complexType>
      <xs:choice>
        <xs:element ref="Roadway" maxOccurs="unbounded"/>
```

```xml
        </xs:choice>
      </xs:complexType>
  </xs:element>
  <xs:element name="Roadway">
    <xs:complexType>
      <xs:choice minOccurs="0" maxOccurs="unbounded">
        <xs:element ref="Speeds" minOccurs="0" maxOccurs="unbounded"/>
      </xs:choice>
      <xs:attribute name="name" type="xs:string" use="required"/>
      <xs:attribute name="alignmentRefs" type="alignmentNameRefs" use="required"/>
    </xs:complexType>
  </xs:element>
  <xs:element name="DesignSpeed">
    <xs:annotation>
      <xs:documentation>設計速度</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:attribute name="speed" type="speed"/>
    </xs:complexType>
  </xs:element>
  <xs:element name="Speeds">
    <xs:complexType>
      <xs:choice minOccurs="0" maxOccurs="unbounded">
        <xs:element ref="DesignSpeed" maxOccurs="unbounded"/>
      </xs:choice>
    </xs:complexType>
  </xs:element>
  <xs:simpleType name="slope">
    <xs:annotation>
      <xs:documentation>This item is the   slope. Unit of measure for this item is PERCENT %.</xs:documentation>
    </xs:annotation>
    <xs:restriction base="xs:double"/>
  </xs:simpleType>
  <xs:element name="AlignPI">
    <xs:annotation>
      <xs:documentation>IP 点</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:choice maxOccurs="unbounded">
        <xs:element ref="PI"/>
      </xs:choice>
    </xs:complexType>
  </xs:element>
  <xs:element name="AlignPIs">
    <xs:annotation>
```

```xml
        <xs:documentation>IP 点リスト</xs:documentation>
      </xs:annotation>
      <xs:complexType>
        <xs:sequence minOccurs="2" maxOccurs="unbounded">
          <xs:element ref="AlignPI"/>
        </xs:sequence>
      </xs:complexType>
    </xs:element>
    <xs:simpleType name="surfTypeEnum">
      <xs:annotation>
        <xs:documentation>TIN is the acronym for "triangulated irregular network", a surface comprised of 3 point faces</xs:documentation>
        <xs:documentation>grid is a surface comprised of 4 point faces.</xs:documentation>
      </xs:annotation>
      <xs:restriction base="xs:string">
        <xs:enumeration value="TIN"/>
        <xs:enumeration value="grid"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:element name="Surfaces">
      <xs:annotation>
        <xs:documentation>要素種別サーフェスセット</xs:documentation>
      </xs:annotation>
      <xs:complexType>
        <xs:sequence>
          <xs:element ref="Surface" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="desc" type="xs:string"/>
        <xs:attribute name="name" type="xs:string"/>
      </xs:complexType>
      <xs:unique name="uSrfName">
        <xs:selector xpath="Surface"/>
        <xs:field xpath="@name"/>
      </xs:unique>
    </xs:element>
    <xs:element name="Surface">
      <xs:annotation>
        <xs:documentation>要素種別サーフェス</xs:documentation>
        <xs:documentation>Definition is a collection of points and faces that define the surface.</xs:documentation>
        <xs:documentation>Watersheds is a collection the watershed boundaries for the surface.</xs:documentation>
      </xs:annotation>
      <xs:complexType>
        <xs:sequence>
          <xs:element ref="Definition"/>
        </xs:sequence>
        <xs:attribute name="name" type="xs:string" use="required"/>
```

```xml
      <xs:attribute name="desc" type="xs:string"/>
    </xs:complexType>
  </xs:element>
  <xs:element name="Definition">
    <xs:annotation>
      <xs:documentation>サーフェス定義</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:sequence>
        <xs:element ref="Pnts"/>
        <xs:element ref="Faces" maxOccurs="unbounded"/>
      </xs:sequence>
      <xs:attribute name="surfType" type="surfTypeEnum" use="required"/>
    </xs:complexType>
  </xs:element>
  <xs:element name="Pnts">
    <xs:annotation>
      <xs:documentation>点集合</xs:documentation>
      <xs:documentation>The id values are referenced by the surface faces and breaklines.</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:sequence>
        <xs:element ref="P" minOccurs="3" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:complexType>
    <xs:unique name="uSrfPntNum">
      <xs:selector xpath="P"/>
      <xs:field xpath="@id"/>
    </xs:unique>
  </xs:element>
  <xs:element name="P">
    <xs:annotation>
      <xs:documentation>点</xs:documentation>
      <xs:documentation>The id values are referenced by the surface faces for the coordinate values.</xs:documentation>
    </xs:annotation>
    <xs:complexType mixed="true">
      <xs:simpleContent>
        <xs:extension base="PointType">
          <xs:attribute name="id" type="xs:positiveInteger" use="required"/>
        </xs:extension>
      </xs:simpleContent>
    </xs:complexType>
  </xs:element>
  <xs:element name="Faces">
    <xs:annotation>
```

```
        <xs:documentation>面集合</xs:documentation>
        <xs:documentation>The faces are defined by either 3 (TIN) or 4 (grid) points, as indicated by the "surfType" attribute</xs:documentation>
        <xs:documentation>For the north/east/elev values, each point of the face references a "P"point element point in the SurfPnts collection.</xs:documentation>
      </xs:annotation>
      <xs:complexType>
        <xs:sequence>
          <xs:element ref="F" maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:complexType>
    </xs:element>
    <xs:simpleType name="FaceType">
      <xs:list itemType="xs:integer"/>
    </xs:simpleType>
    <xs:element name="F">
      <xs:annotation>
        <xs:documentation>面</xs:documentation>
      </xs:annotation>
      <xs:complexType mixed="true">
        <xs:simpleContent>
          <xs:extension base="FaceType"/>
        </xs:simpleContent>
      </xs:complexType>
    </xs:element>
  </xs:schema>
```