

1 Flexible Bus Services

- v0-1 28 April 2023
- v0-2 17 May 2023, following BODS project team review
- v0-3 23 May 2023, released for consultation.
- V0-4 27 June 2023, following consultation.
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- V1-0-1 5 September 2023, update OTH to otherPoint

The content in this document replaces Chapter 10 of the TXC-PTI profile document and will be included in v1.2 of the profile.

1.1 Background

There are a multitude of approaches to the specification and promotion of flexible bus services unlike fixed route and timetable services where there are fewer opportunities for divergence from a common approach.

This section sets out how the majority of flexible bus services registered as flexibly routed with the OTC can be specified within a BODS compliant manner, enabling data to be provided to BODS and for data consumers to present data in a manner that the operator would expect. The Services supported:

- Do not have a fixed timetable.
- Have a route which may be determined by the requests made by passengers.
- Include those where passengers may need to book in advance of using the service.
- Are open to anyone who lives in the area where the services operate.

A flexible bus service will use spatial zones or lists of fixed stops but do not have a fixed order of stops and or a timetable published in advance. This allows for flexible services to have combinations of

- (i) area-to-fixed stop,
- (ii) area-to-area,
- (iii) fixed stop-to-fixed stop with no fixed timetable
- (iv) fixed stop-to-fixed stop with no pre-defined route.

Within a zone there does not have to be fixed or marked stop(s) and in these situations the service will call on demand at a location agreed during the booking process.

Both zones and fixed stop points use the requisite NaPTAN stop types which need to be defined in NaPTAN in advance of submission to BODS.

1.2 Declaring a flexible service

A **FlexibleService** is constructed, at a high level, in essentially the same way as a **StandardService**, and forms part of the **Service**, generally replacing the **StandardService**.

It is possible for a single service to contain both **StandardService** and **FlexibleService** components.

A **FlexibleService** is required to have the **ServiceClassification** of type Flexible.

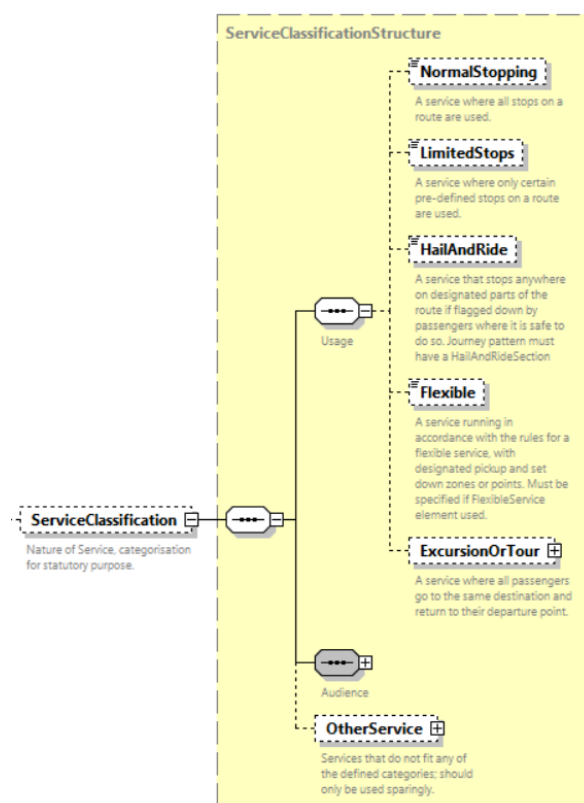


Figure 1 The ServiceClassification structure

```
<ServiceClassification>
  <Flexible/>
</ServiceClassification>
```

Where a single service contains both **StandardService** and **FlexibleService** components only the **ServiceClassification** of type Flexible can be specified.



A flexible bus service is required to have the **ServiceClassification** of type Flexible.

1.3 The FlexibleJourneyPattern element

In a **FlexibleService** there is a **FlexibleJourneyPattern** instead of a **JourneyPattern**. For this reason, a **FlexibleService** in TXC-PTI will have the same constraints as a **StandardService**, and a **FlexibleService** shall have at least one **FlexibleJourneyPattern**.

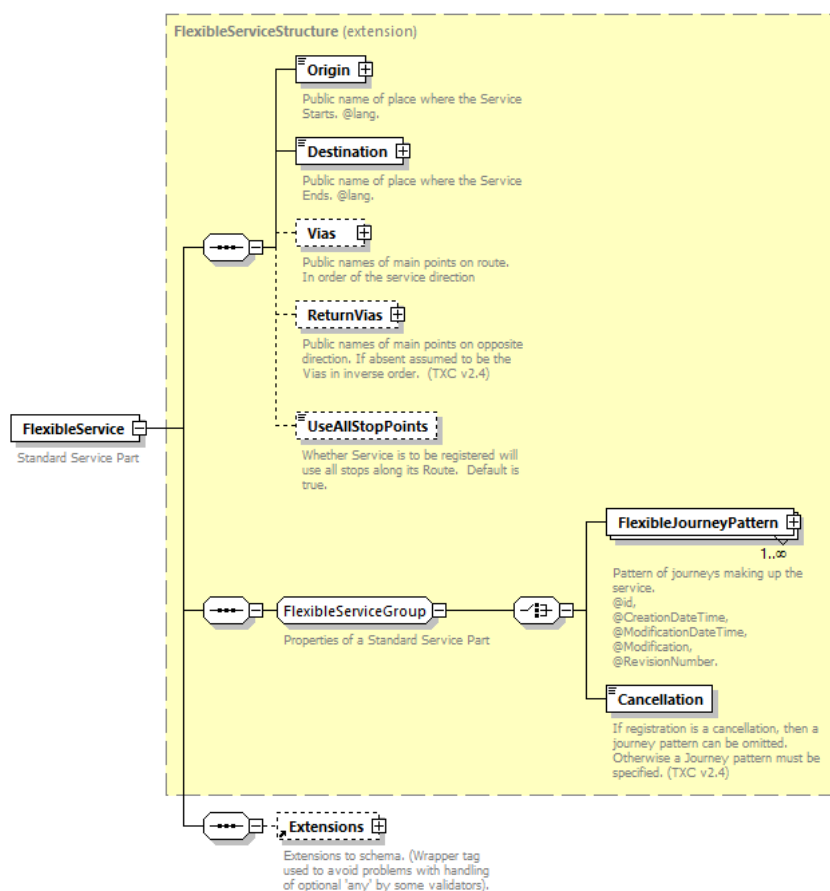


Figure 2 - The FlexibleService structure



In TXC-PTI, a flexible service shall have a **FlexibleService** which shall consist of at least one **FlexibleJourneyPattern**.

At the top level, there is a high degree of commonality between a standard (non-flexible) service and a flexible service. The **CommonJourneyGroup** is, in fact, common between both and a flexible service shall therefore follow the same rules for these elements – see section 8.2.

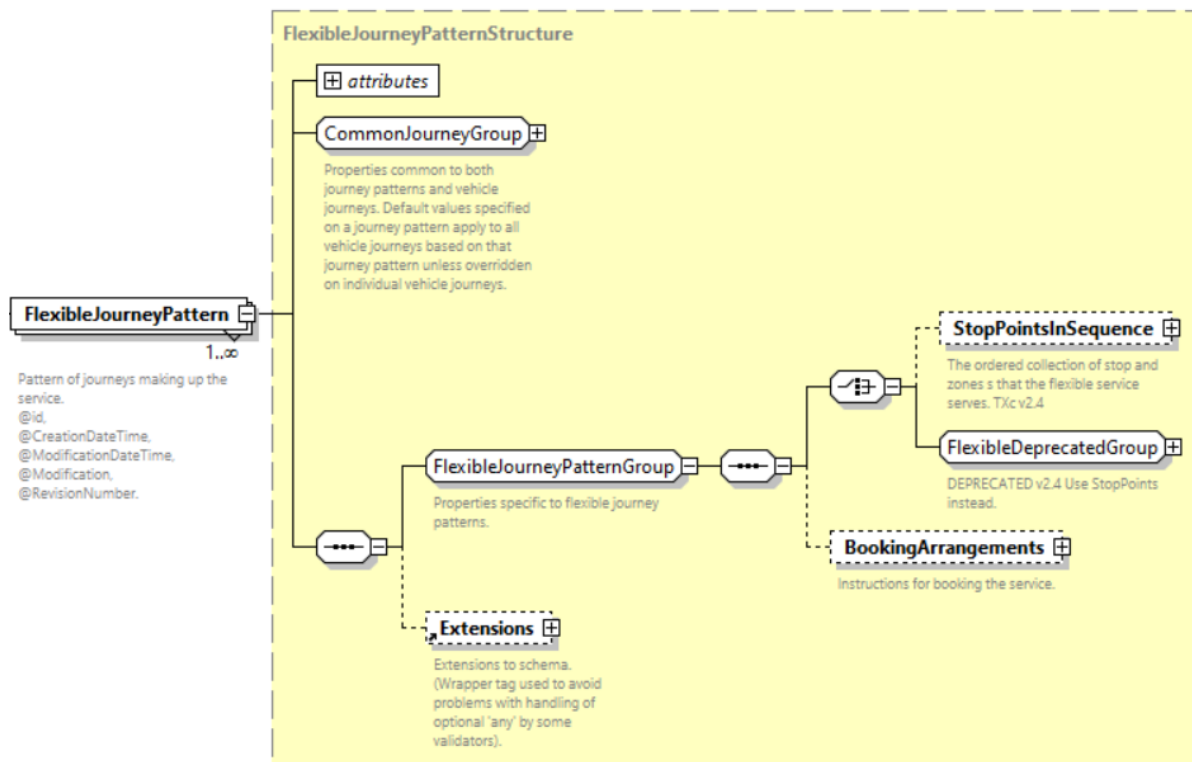


Figure 3 The FlexibleJourneyPattern structure

Beyond the common journey elements, the flexible service is defined as an ordered set of stops, using the **StopPointsInSequence** element, and information shall be provided as to the booking arrangements needed to book the flexible service.

The TxC-PTI profile does not support the use of the deprecated FlexibleZones and FixedStopPoints from TransXChange v2.1 and earlier, rather it requires the use of StopPointsInSequence.

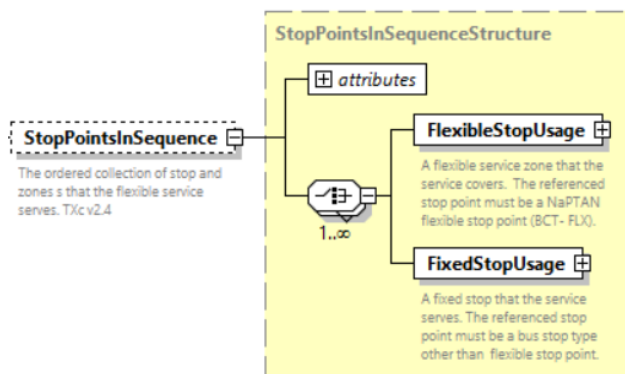


Figure 4 The StopPointsInSequence structure

Where a service uses bus stops as pick up or drop off locations then standard NaPTAN stops can be used of a type other than BCT-FLX¹ in the same way as would be used in a

¹ FlexibleZone stop type, BCT-FLX is used in the text to reduce the risk of confusion with the deprecated FlexibleZone from earlier versions of TransXChange.

StandardService, and include activity to refine service behaviour at the stop point. these are identified through the use of FixedStopUsage.

Where the service does not use fixed locations and will pick up or set down anywhere within an operational area or zone, then FlexibleStopUsage shall be used and stops of NaPTAN type BCT-FLX shall be used to define the zone area.

A BCT-FLX stop comprises a single ATCOCode which comprises of three or more location elements describing the spatial boundary of the zone. For more information about BCT-FLX stop types see the NaPTAN Schema Guide v2.4 0.57 or later.

Where there is a there is a short term requirement and a stop is not in NaPTAN then the stop can be defined within the TXC file but as defined in 6.1 this will only be accepted for a maximum period of 2 months.

A combination of fixed stops and flexible stops can be used to describe services where there a mix of behaviours during the course of a trip, for example where a service will pick up from a zone with a single destination such as an interchange to other services.

1.4 Stop PointsInSequence

Through the use of **StopPointsInSequence** the order which stops or zones are visited can be described through the use of SequenceNumber.

An example of a single Zone being served:

```
<FlexibleJourneyPattern id="jp_1">
  <Direction>outbound</Direction>
  <StopPointsInSequence>
    <FlexibleStopUsage>
      <!-- Atterby -->
      <StopPointRef>270002700155</StopPointRef>
    </FlexibleStopUsage>
  </StopPointsInSequence>
  <BookingArrangements>
    ...
  </BookingArrangements>
</FlexibleJourneyPattern>
```

Using Sequence number the order stops will be visited can be specified, in the below example the first two stops are marked stops identified using FixedStopUsage, then stop 3 is a zone identified through FlexibleStopUsage with the final stop again being a marked stop, a vehicle journey would then visit the stop points in the order described by the sequence number. Where there is no sequence number specified there is no set order a journey will visit the stop points. Within a Zone a trip can stop as many times as booked in any order including when it is included within a sequence.

TimingStatus is set to otherPoint because there is no fixed timetable so the stop cannot be used as a timing point for this journey pattern.

```
<StopPointsInSequence>
  <FixedStopUsage SequenceNumber="1">
    <!-- Washingborough Shop -->
    <StopPointRef>0600000102</StopPointRef>
    <TimingStatus>otherPoint</TimingStatus>
  </FixedStopUsage>
  <FixedStopUsage SequenceNumber="2">
    <!-- Washingborough Church -->
    <StopPointRef>0600000101</StopPointRef>
    <TimingStatus>otherPoint</TimingStatus>
  </FixedStopUsage>
  <FlexibleStopUsage SequenceNumber="3">
```

```

        <!-- Nettleham-->
        <Activity>pickUpAndSetDown</Activity>
        <StopPointRef>0600000201</StopPointRef>
    </FlexibleStopUsage>
    <FixedStopUsage SequenceNumber="4">
        <!-- Heighington -->
        <StopPointRef>0600000103</StopPointRef>
        <TimingStatus>otherPoint</TimingStatus>
    </FixedStopUsage>
</StopPointsInSequence>
    
```



The TXC-PTI does not support the use of the deprecated FlexibleZone and FixedStopPoints.

Where FixedStopUsage and FlexibleStopUsage is specified TimingStatus shall be set to otherPoint.

The stop type of StopPointRef specified in **FlexibleStopUsage** must be of type BCT-FLX

1.5 BookingArrangements

The **BookingArrangements** element describes the booking arrangements for the flexible service.

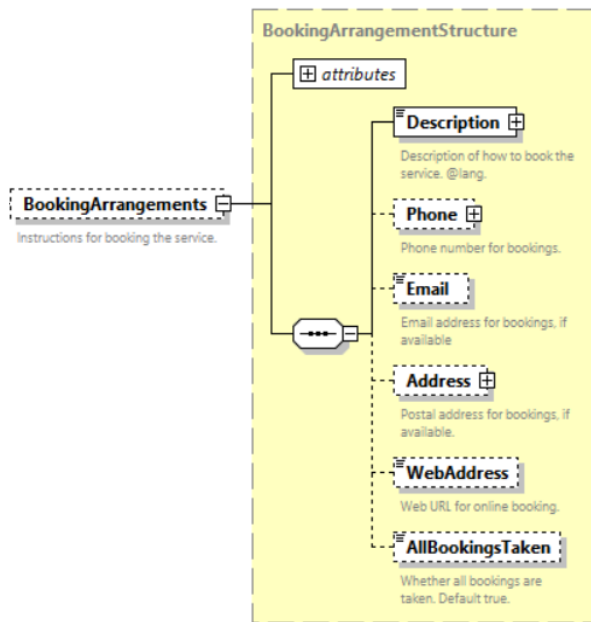


Figure 5 FlexibleVehicleJourney / BookingArrangements Structure

Table 1 Permitted elements for BookingArrangements

Element Name	Data Type	Used in TXC-PTI
Description	NaturalLanguageString	Required
Phone	TelephoneContactStructure	Optional, one of Phone, Email, Address or WebAddress is required by BODS

Email	<i>EmailAddressType</i>	Optional, one of Phone, Email, Address or WebAddress is required by BODS
Address	<i>PostalAddressStructure</i>	Optional, one of Phone, Email, Address or WebAddress is required by BODS
WebAddress	<i>anyURI</i>	Optional, one of Phone, Email, Address or WebAddress is required by BODS
AllBookingsTaken	<i>Boolean</i>	Default is true

For example a flexible bus service which can be booked by all methods except by post would be coded as:

```
<BookingArrangements>
  <Description>The booking office is open for all advance booking Monday to
  Friday 8:30am - 6:30pm, Saturday 9am - 5pm</Description>
  <Phone>
    <TelNationalNumber>0345 234 3344</TelNationalNumber>
  </Phone>
  <Email>CallConnect@lincolnshire.gov.uk</Email>
  <WebAddress>https://callconnect.opendrt.co.uk/OpenDRT/</WebAddress>
  <AllBookingsTaken>true</AllBookingsTaken>
</BookingArrangements>
```

Note that the details of the opening hours for the booking office are included within the Description, there being no data structure to provide this in TXC.

It is only possible to supply a single phone number, email address, physical address or web site in TXC. Alternatives should be provided, where essential, within the Description but avoided if possible. Many flexible services allow bookings using a smartphone app. The details of these apps and or URLs to the relevant application stores shall be provided on the site referenced by WebAddress.



Within **BookingArrangements** at least one of Phone, Email, Address or WebAddress must be specified.

BookingArrangements/Description must be provided by data consumers to the end user.

1.6 The FlexibleVehicleJourney element

The **FlexibleVehicleJourney** element describes the availability of a flexible journey. It adds time information to a **FlexibleJourneyPattern** instance. A **FlexibleVehicleJourney** comprises a number of elements; the elements fall into three groups:

1. **CommonJourneyGroup**: Shared elements common to journey patterns and vehicle journeys (See **JourneyPattern** / **CommonJourneyGroup**).
2. **VehicleJourneyGroup**: Elements specific to both fixed and flexible vehicle journeys (See **VehicleJourney** / **VehicleJourneyGroup**).
3. **FlexibleVehicleJourneyGroup**: Elements specific to flexible route vehicle journeys.

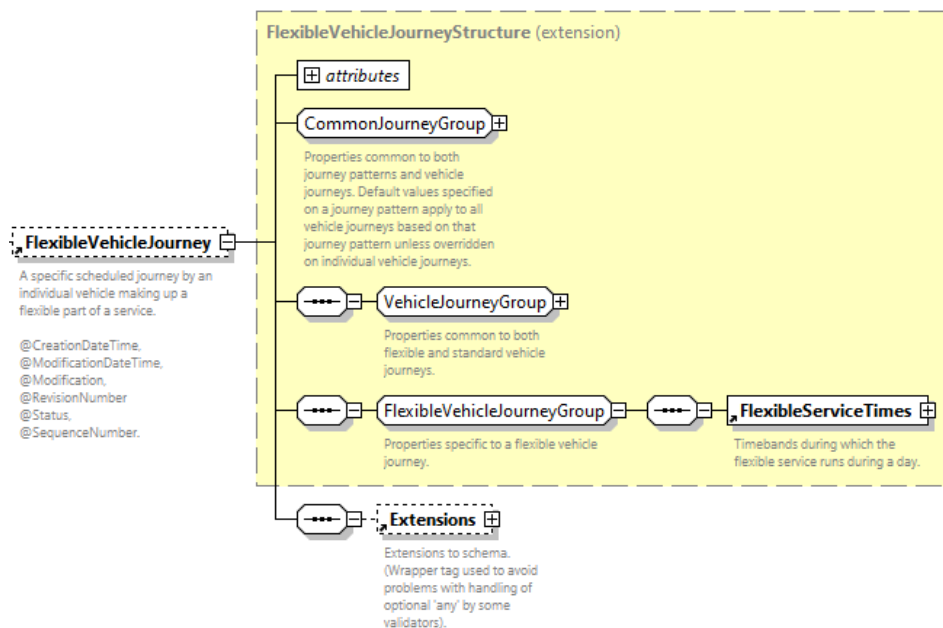


Figure 6 The FlexibleVehicleJourney structure

The **OperatingProfile** details contained within the **VehicleJourney** structure for regular and irregular operation of a trip in the same way as for a **StandardService** and shall follow the same rules for these elements – see section 9.3.

The **FlexibleServiceTimes** element describes the times between which the service operates. **FlexibleServiceTimes** may either be:

- AllDayService: Indicating the service runs all day, or
- PeriodsOfOperation: A collection of at least one ServicePeriod element, made up of:
 - o StartTime: Time at which time band starts.
 - o EndTime: Time at which time band ends.

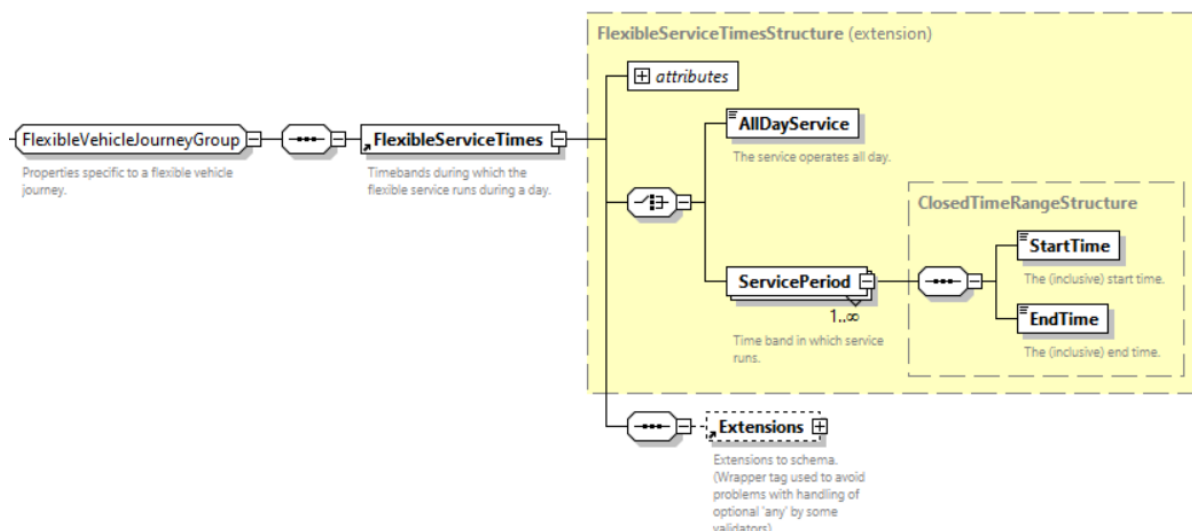


Figure 7 FlexibleVehicleJourney / FlexibleServiceTimes Element

For example a service operating between 07:00 and 12:00 and 13:00 to 19:00 would be specified as:

```
<FlexibleServiceTimes>
  <ServicePeriod>
    <StartTime>07:00:00</StartTime>
    <EndTime>12:00:00</EndTime>
  </ServicePeriod>
  <ServicePeriod>
    <StartTime>13:00:00</StartTime>
    <EndTime>19:00:00</EndTime>
  </ServicePeriod>
</FlexibleServiceTimes>
```



At least one **FlexibleServiceTimes** must be specified.

1.7 Calls Only When Arranged with Driver

Where there is a journey which will only call at a stop for a passenger already on the bus, or a pickup is arranged with the driver of an earlier journey, the use of notes to describe the behaviour can result in data consumers presenting information to the customer which does not include the restriction. In this situation where there are only one or a small number of stops involved the use of FlexibleService structures places a significant overhead on data creation and consumption.

To overcome this overhead the behaviour of **JourneyPatternStopUsageStructure/Activity** is updated (through the schema v2.4.1) to include **pickUpDriverRequest**, **setDownDriverRequest** and **pickUpAndSetDownDriverRequest**. This allows the activity to be used in both **StandardService** and **FlexibleService**.

Element Name	Data Type	Use in TXC-PTI
...		
Activity	<i>VehicleAtStopActivity Enumeration</i>	<p>The activity at the stop, which is to be duplicated on the To end of the incoming link and the From end of the next, outgoing link.</p> <p>Shall always be included if the behaviour is not the default pickUpAndSetDown.</p> <p>Permitted values are <i>pickup</i>, <i>setDown</i>, <i>pickUpAndSetDown</i>, <i>pass</i>, <i>pickUpDriverRequest</i>, <i>setDownDriverRequest</i> and <i>pickUpAndSetDownDriverRequest</i>.</p> <p>The majority of stops will inherit the TXC default of <i>pickUpAndSetDown</i>.</p>
...		

1.8 Changes to the remainder of the Profile document to reflect FlexibleService requirements.

Currently Table 8 – Permitted elements for Service says:

Element Name	Data Type	Used in TXC-PTI
...		
ServiceClassification	<i>ServiceClassificationStructure</i>	Not used
...		

This is changed to:

Element Name	Data Type	Used in TXC-PTI
...		
ServiceClassification	<i>ServiceClassificationStructure</i>	Required for Flexible Bus Services, see 10.x
...		

5.3.7 Other Elements

Currently states:

- PublicUse** shall be included and shall state explicitly whether a service is available to the public (true) or whether it is a closed service (false). This allows school services, etc. which are closed to nevertheless be entered into data, and hence allow trips to school to be planned for students. This flag shall be in place of the **SchoolOrWorks** designation, part of the **ServiceClassification**. **ServiceClassification** is related to registrations and is not public-facing, and hence shall not be used within a TXC-PTI document.

This is changed to:

- PublicUse** shall be included and shall state explicitly whether a service is available to the public (true) or whether it is a closed service (false). This allows school services, etc. which are closed to nevertheless be entered into data, and hence allow trips to school to be planned for students. This flag shall be in place of the **SchoolOrWorks** designation, part of the **ServiceClassification**. **ServiceClassification** is only required to be used for flexible bus services.